UNIVERZITET U SARAJEVU

FAKULTET ZA SAOBRAĆAJ I KOMUNIKACIJE

STUDIJSKI PROGRAM
POŠTANSKO-LOGISTIČKE TEHNOLOGIJE
II CIKLUS STUDIJA
NA UNIVERZITETU U SARAJEVU – FAKULTETU ZA SAOBRAĆAJ I KOMUNIKACIJE

Nastavni plan

Popis obaveznih i predviđenih izbornih predmeta sa šiframa, brojem ECTS bodova i brojem kontakt sati nastave potrebnih za njihovu izvedbu (vježbe, predavanja, praksa, seminar, terenski rad, laboratorijske vježbe isl.);

NASTAVNI PLAN ZA ODSJEK: KOMUNIKACIJE, USMJERENJE: POŠTANSKO-LOGISTIČKE TEHNOLOGIJE

NASTAVNI PLAN ZA ODSJEK: KOMUNIKACIJE, USMJERENJE: POŠTANSKO-LOGISTIČKE TEHNOLOGIJE

R.b	Šifra predmeta	Naziv predmeta	Status predmeta	I sem.				II sem.				III sem.				IV sem.
				P	V	L	ECTS	P	V	L	ECTS	P	V	L	ECTS	Izrada rada (ECTS)
1.	02CPTOS020101PL	MENADŽMENT U TRANSPORTU I LOGISTICI	obavezni	3	2	1	6									
2.	03CPTOS020101PL	GEOINFORMACIJSKI SISTEMI	obavezni	3	2	1	6									
3.	04CPTOS020101PL	LOGISTIKA POVRATNIH TOKOVA	obavezni	3	2	1	6									
4.	05CPTOS020101PL	SIGURNOST I ZAŠTITA U POŠTANSKO-LOGISTIČKIM SISTEMA	obavezni	3	2	1	6									
5.	02CPTOS020101PL	SIMULACIJE POŠTANSKO-LOGISTIČKIH SISTEMA I OPERACIJE	obavezni	3	2	1	6									
6.	06CPTOS020102PL	POSLOVNI MODELI KURIRSKIH SLUŽBI	obavezni					3	2	1	6					
7.	07CPTOS020102PL	INFORMACIONE TEHNOLOGIJE I ŠPEDITERSKO POSLOVANJE	obavezni					3	2	1	6					
8.	08CPTOS020102PL	LOKACIJSKI I NAVIGACIJSKI SISTEMI	obavezni					3	2	1	6					
9.			izborni					3	2	1	6					
10.			izborni					3	2	1	6					
11.	11CPTOS020203PL	IOT U POŠTANSKO-LOGISTIČKIM SISTEMIMA	obavezni									3	2	1	6	
12.	12CPTOS020203PL	SAOBRAĆAJNA POLITIKA	obavezni									3	2	1	6	
13.	13CPTOS020203PL	UPRAVLJANJE ODNOSIMA S KORISNICIMA	obavezni									3	2	1	6	

14.			izborni			3	2	1	6	
15.			izborni			3	2	1	6	
16.	16CPTOS020204PL	Završni master rad	obavezni							30
Broj potrebnih kredita				**30**	**30**	**30**				**30**

Izborni predmeti: usmjerenje: POŠTANSKO-LOGISTIČKE TEHNOLOGIJE

Šifra predmeta	**Naziv predmeta**	**Broj sati**			**ECTS**	**Semestar**
		P	**V**	**L/PR**		
09-10-1CPTES020202PL	UPRAVLJANJE KVALITETOM U LOGISTICI	3	2	1	6	**II**
09-10-2CPTES020202PL	MAŠINSKO UČENJE U LOGISTIČKIM SISTEMIMA	3	2	1	6	**II**
09-10-3CPTES020202PL	NAPREDNO MODELIRANJE U LOGISTICI	3	2	1	6	**II**
14-15-1CPTES020203PL	UPRAVLJANJE PROJEKTIMA I INVESTICIJAMA U SAOBRAĆAJU I KOMUNIKACIJAMA	3	2	1	6	**III**
14-15-2CPTES020203PL	KOMUNIKACIJSKE TEHNOLOGIJE I OKOLIŠ	3	2	1	6	**III**
14-15-3CPTES020203PL	METODOLOGIJA ISTRAŽIVAČKOG I NAUČNOG RADA	3	2	1	6	**III**

Opis silabusa na studijskom programu Poštansko-logističke tehnologije na b/h/s jeziku

Šifra predmeta: 02CPTOS020101PL	**Naziv predmeta: MENADŽMENT U TRANSPORTU I LOGISTICI**		
Ciklus: II	**Godina: I**	**Semestar: I**	**Broj ECTS kredita:6**
Status: Obavezni predmet		**Ukupan broj sati: 90** Predavanja 45 Vježbe 30 Laboratorijske vježbe 15	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**		

Preduslov za upis:	NE
Cilj (ciljevi) predmeta:	Cilj predmeta je upoznavanje sa djelovanjem saobraćajnog sistema u tržišnim uvjetima i međunarodnim standardima, kako bi se obezbjedilo efektivno i efikasno poslovanje. Osposobljavanje studenata u sticanju određenih znanja o standardima i standardizaciji, kao i međuvezama različitih dijelova proizvodnje i ekonomskih procesa na koje utiče tehnička standardizacija.
Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)*	1. Osnove menadžmenta. Pojam, process menadžmenta i međuzavisnost sa organizacijom. Pojam menadžmenta i procesa menadžmenta. Karakteristike savremenog menadžera. Funkcije menadžera. 2. Opće i specifične karakteristike menadžmenta u prometnom sustavu. Problematika organizacije i menadžmenta u prometnom sustavu. Definicije i sadržaj menadžmenta. Menadžment i poduzetništvo u transportnim i telekomunikacijskim preduzećima. 3. Opće i specifične karakteristike menadžmenta u prometnom sustavu. Menadžerski poslovi u upravama, zavodima i agencijama. Razvitak logističkog menadžmenta. Odnosi prometne politike i menadžmenta. Razvoj prometnog sustava i prostorno-gospodarsko strukturiranje. 4. Menadžerski koncepti poboljšanja i/iliinoviranje poslovnihprocesa. Procesno-orjentirani menadžment. Inoviranje i/ili reinženjering poslovih procesa. Reinženjering logističkih procesa. 5. Planiranje kao funkcija i aktivnost menadžmenta. Planiranje u prometnom preduzeću. Politike i strategije prometnog preduzeća. Procesni pristup strategijskom planiranju. 6. Planiranje kao funkcija i aktivnost menadžmenta. Strategijska analiza konkurentske structure prometne grane. Metode scenarija u izboruefektivne strategije preduzeća. 7. Organizacijska struktura i procesi organizacije. Pojam i šira shvatanja organizacije. Organizacijska struktura. 8. Organizacijska struktura i procesi organizacije. Uređivanje odnosa u organizaciji. 9. Organizacijska struktura i procesi organizacije.

	Procesna i na znanju utemeljena organizacija. Primjeri organizacijske structure nekih transportnih i telekomunikacijskih poduzeća. 10. Vođenje poslova i motiviranje. Vođenje poslova i vodstvo. 11. Vođenje poslova i motiviranje. Utjecaji na ponašanje ljudi i motivacija. 12. Upravljanje ljudskim resursima. Upravljanje ljudskim resursima kao funkcija menadžmenta 13. Upravljanje ljudskim resursima. Aktivnosti u procesu upravljanja ljudskim resursima. Osobni razvitak menadžera. 14. Menadžerska kontrola i upravljanje kvalitetom. Osnove savremene standardizacije. Metode preuzimanja i označavanja standarda, stepeni usklađenosti i terminologija u vezi sa preuzimanjem standarda. Infrastruktura kvaliteta. 15. Menadžerska kontrola i upravljanje kvalitetom. Standardi sistema upravljanja (MSS - Management Systems Standards). Integrisani sistemi upravljanja (IMS - Integrated Management Systems).
Ishodi učenja:	Znanje: Stečena znanja koristit će se za prepozanavanje glavnih tehnoloških procesa, kao i modela upravljanja specifičnih za saobraćajne sisteme. Vještine: Sposobnost primjene teorijskih i praktičnih znanja iz oblasti menadžmenta u prometu. Kompetencije: Sistemski pristup u razumjevanju standardizacije, ovladavanje savremenom poslovnom terminologijom, kao i predočeni praktični primjeri iz područja saobraćaja i komunikacija, pomoći će studentima u njihovom uključivanju u tehničke i druge aktivnosti po završetku studija i zapošljavanju.
Metode izvođenja nastave:	Metoda usmenog izlaganja, metoda razgovora, metoda demonstracije, metoda rada u skupini.
Metode provjere znanja sa strukturom ocjene:	Ocjena kreativnosti na nastavi i vježbama uz izradu samostalnih radova, ocjena parcijalnog testa u toku nastave kao i ocjena završnog ispita. Kriterijum praćenja rada i ocjenjivanja studenta u toku nastave i to prema sljedećem načinu:

	– Domaća zadaća/seminarski rad/praktični rad/ 15 bodova (%), položeno ako se osvoji najmanje 55 %. – I Parcijalni ispit/test/provjera znanja/35 bodova (%), položen je ako se osvoji najmanje 55 %. – Završni ispit (II Parcijalni) 50 bodova (%), položeno ako se osvoji najmanje 55 %. – Završni ispit (Integralni) 85 bodova (%), položeno ako se osvoji najmanje 55 %. Završni ispit se organizuje kao pismeni/usmeni. Student na završnom ispitu može da polaže gradivo koje nije polagao i/ili uspješno okončao tokom trajanja semestra. Potreban uslov za uspješno okončan ispit je postignut rezultat od najmanje 55% bodova od maksimalnog broja bodova na parcijalnom i završnom dijelu ispita, a dovoljan uslov je da suma ostvarenih bodova (kroz: domaću zadaću, prisustvo, parcijalni i završni ispit) bude 55. Zadaća se organizuje kroz pisanje domaće zadaće i projekata. Zadaća nema mogućnost popravljanja. Za studente koji nisu uspješno okončali parcijalni ispit, završni ispit se sastoji iz cjelokupnog pređenog gradiva u toku nastave. Popravni ispit se organizuje kao i završni ispit. Konačan uspjeh studenta nakon svih predviđenih oblika provjere znanja, vrednuje se i ocjenjuje sistemom ocjenjivanja kako slijedi: a) 10 (A) - izuzetan uspjeh bez grešaka ili sa neznatnim greškama, nosi 95-100 bodova; b) 9 (B) - iznad prosjeka, sa ponekom greškom, nosi 85-94 bodova; c) 8 (C) - prosječan, sa primjetnim greškama, nosi 75-84 bodova; d) 7 (D) - općenito dobar, ali sa značajnijim nedostacima, nosi 65-74 bodova; e) 6 (E) - zadovoljava minimalne uslove, nosi 55-64 bodova; f) 5 (F, FX) - ne zadovoljava minimalne uslove, manje od 55 bodova. Ukupno vrednovanje svih obaveza studenta u toku semestra, odnosno ocjena na ispitu zasnovana je na ukupnom broju bodova (%) koje je student stekao ispunjavanjem predispitnih obaveza i polaganjem parcijalnog i završnog ispita, a prema kvalitetu stečenih znanja i vještina, i sadrži maksimalno 100 bodova, te se utvrđuje prema sljedećoj skali:

	Obaveze studenta Bodovi (%) Prisutnost na predavanjima i vježbama... - Zadaća/Seminarski/Praksa/.....15 bodova (%) I Parcijalni ispit/Test/Provjera znanja/.....35 bodova (%) Završni ispit (II Parcijalni) .....50 bodova (%) Završni ispit (Integralni) .....85 bodova (%)
Literatura:	1. Vujadin B. Vešović, „MENADŽMENT U SAOBRAĆAJU“, Univerzitet u Beogradu, Saobraćajni fakultet, 1997.
	2. Šefkija Čekić, Ivan Bošnjak, „MENADŽMENT U TRANSPORTU I KOMUNIKACIJAMA“, Fakultet za saobraćaj i komunikacije UNSA, Fakultet prometnih znanosti UNIZG, Sarajevo, Zagreb, 2000.
	1. Alija Behmen, Sabira Salihović: MATERIJALI I ROBE U TRANSPORTU - KnjigaI, klasifikacija, standardizacija, identifikacija, Fakultet za saobraćaj i komunikacije Sarajevo i DES-Sarajevo, Sarajevo, 2007.
	2. Alija Behmen, Sabira Salihović: MATERIJAL I ROBE U TRANSPORTU - Knjiga II, kvalitet: osnove, principi, kontrola, Fakultet za saobraćaj i komunikacije Sarajevo i DES-Sarajevo, Sarajevo, 2008.
	3. Međunarodni/regionalni/nacionalni standardi

Šifra predmeta: 03CPTOS020101PL	**Naziv predmeta: GEOINFORMACIJSKI SISTEMI**		
Ciklus: II	**Godina: I**	**Semestar: I**	**Broj ECTS kredita:6**
Status: Obavezni predmet		**Ukupan broj sati: 90** Predavanja 45 Vježbe 30 Laboratorijske vježbe 15	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet** [u ovu rubriku ne unositi imena. Ostaviti formulaciju kako je naznačena u ovoj rubrici]		
Preduslov za upis:	NE		
Cilj (ciljevi) predmeta:	Kurs ima za cilj da upozna sa osnovnim konceptima GIS sistema, načinom rada ovih sistema, planiranjem i implementacijom, te mogućim primjenama GIS-a.		
Tematske jedinice:	1. Pojam i definicija GIS-a, historija razvoja		

	2. Komponente GIS-a (hardware, software, lifeware, orgware, dataware) 3. Proces prikupljanja i rukovanja GIS podacima 4. Struktura prostornih podataka i modeli 5. Koordinatni sistemi, projekcije, georeferenciranje 6. Baze geografskih podataka 7. Standardizacija u GIS-u 8. Upiti na GIS i GIS odgovori 9. Izlazni podaci i kartografija 10. Tehnike grafičkog prikaza 11. Principi slojevitog prikaza prostornih podataka 12. Oblasti primjene i osnovne GIS funkcije 13. Web i mobilni GIS 14. Primjena GIS-a u planiranju telekomunikacijske infrastrukture 15. Primjena GIS-a u planiranju saobraćajne infrastrukture
Ishodi učenja:	Studenti će se u okviru kursa upoznati kako teče kompletan proces od trenutka javljanja ideje i potrebe za GIS-om, preko prikupljanja podataka i formiranja GIS baze podataka, georeferenciranja, grafičkog prikaza i korištenja GIS sistema. Studenti će biti upoznati sa standardizacijom u oblasti GIS-a, principima web i mobilnih GIS sistema te konkretnoj primjeni na primjerima. Teoretski dio nastave će biti popraćen praktičnim dijelom u okviru rada u odgovarajućim GIS softverskim alatima.
Metode izvođenja nastave:	Teorijski dio nastave pripremljen iz referentne literature prezentuje se upotrebom savremenih multimedijskih sredstava, uz podsticanje interaktivnosti u nastavi. Vježbe i laboratorijske vježbe održavaju se uz upotrebu savremenih softverskih alata u kompjuterskim laboratorijama fakulteta, te rješavanje konkretnih problemskih i praktičnih zadataka.
Metode provjere znanja sa strukturom ocjene:	Kriterijum vrednovanja rada i ocjenjivanja studenta u toku nastave, vrši se na sljedeći način: Domaća zadaća/seminarski rad/projektni zadatak od 0 do 15 bodova (15%); Parcijalni ispit/ test/provjera znanja od 0 do 35 bodova (35%); Ukupan broj bodova koji student prema navedenom praćenju u toku nastave može ostvariti iznosi maksimalno 50 bodova (50%). Završni ispit od 0 do 50 bodova (50%). Da bi položio predmet student mora položiti (zadovoljiti) svaki od tri dijela zasebno (seminarski, parcijalni i završni ispit), te u ukupnom zbroju osvojiti minimalno 55 bodova (55%).

	Konačan uspjeh studenta nakon svih predviđenih oblika provjere znanja, vrednuje se i ocjenjuje sistemom ocjenjivanja kako slijedi: a) 10 (A) - izuzetan uspjeh bez grešaka ili sa neznatnim greškama, nosi 95-100 bodova; b) 9 (B) - iznad prosjeka, sa ponekom greškom, nosi 85-94,9 bodova; c) 8 (C) - prosječan, sa primjetnim greškama, nosi 75-84,9 bodova; d) 7 (D) - općenito dobar, ali sa značajnijim nedostacima, nosi 65-74,9 bodova; e) 6 (E) - zadovoljava minimalne uslove, nosi 55-64,9 bodova; f) 5 (F, FX) - ne zadovoljava minimalne uslove, 0 – 54,9 bodova. Ukupno vrednovanje svih obaveza studenta u toku semestra, odnosno ocjena na ispitu zasnovana je na ukupnom broju bodova (%) koje je student stekao ispunjavanjem predispitnih obaveza i polaganjem parcijalnog i završnog ispita, a prema kvalitetu stečenih znanja i vještina, i sadrži maksimalno 100 bodova, te se utvrđuje prema sljedećoj skali: Obaveze studenta Bodovi (%) Domaća zadaća/seminarski rad/projektni zadatak.....15 bodova (%) I Parcijalni ispit/Test/Provjera znanja/.....35 bodova (%) Završni ispit (II Parcijalni + Teorija) .....50 bodova (%)
Literatura:	Obavezna: Nastavni materijal dostupan na web stranici Fakulteta za saobraćaj i komunikacije. Dopunska: 1. O. HUISMAN, ROLF A. DE BY: Principles of Geographic Information Systems, Enschede Netherlands, 2009. 2. Y. FANG, V. SHANDAS, E. ARRIAGA CORDERO: Spatial Thinking in Planning Practice: An Introduction to GIS, Portland, 2014. 3. Virginia Tech eCorridors Program (2002). Strategic Technology Infrastructure for Regional Competitiveness in the Network Economy (vol.4: Fiber-Optic Infrastructure Design Guide.) 4. Zeiler, M. and Environmental Systems Research Institute (Redlands Calif.) (2001). Exploring ArcObjects: GIS by ESRI. Redlands, Calif., Esri.

Šifra predmeta: 04CPTOS020101PL	Naziv predmeta: LOGISTIKA POVRATNIH TOKOVA		
Ciklus: II	**Godina: I**	**Semestar: I**	**Broj ECTS kredita:6**
Status: Obavezni predmet		**Ukupan broj sati: 90** Predavanja 45 Vježbe 30 Laboratorijske vježbe 15	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet** [u ovu rubriku ne unositi imena. Ostaviti formulaciju kako je naznačena u ovoj rubrici]		
Preduslov za upis:	NE		
Cilj (ciljevi) predmeta:	Kurs ima za cilj da upozna sa osnovnim konceptima povratne logistike. Ponovno korištenje proizvoda, djelova proizvoda ili materijala donosi korist kako u ekološkom tako i u socio-ekonomskom pogledu Cilj predmeta je da se studenti upute u oblast povratne logistike sa aspekta različitih logističkih procesa..		
Tematske jedinice:	1. Logistika povratnih tokova - definisanje i obuhvat. 2. Razlozi povrata u povratnoj logistici. 3. Povratno-logistički procesi. 4. Učesnici u logistici povratnih tokova. 5. Upravljanje otpadom – klasifikacija, zakonski propisi, sakupljanje otpada, tretman otpada. 6. Logistički aspekt upravljanja otpadom. 7. Elektronski i električni otpad – Direktive EU, zahtevi prema logističkom sistemu. 8. PET materijal i ambalaža – koncepcije sakupljanja, mogućnosti reciklaže, sortiranja i testiranja. 9. Struktura povratno logističkih mreža – obuhvat, karakteristike, klasifikacija. 10. Mreže povratnih logističkih jedinica. 11. Sistemi povratnih logističkih jedinica. 12. Modeli uobličavanja sistema povratne logistike		
Ishodi učenja:	Znanje: Studenti će se upoznati sa sisteom povratne logistike i njenom ulogom i značajem. Vještine: Studenti će savladati određene alate potrebne za projektovanje i razvoj sistema pocratne logistike. Kompetencije: Nakon položenog ispita student će biti u mogućnosti		

	planirati, projektovati i upravljati sistemom povratne logistike.
Metode izvođenja nastave:	Teorijski dio nastave pripremljen iz referentne literature prezentuje se upotrebom savremenih multimedijskih sredstava, uz podsticanje interaktivnosti u nastavi. Vježbe i laboratorijske vježbe održavaju se uz upotrebu savremenih softverskih alata u kompjuterskim laboratorijama fakulteta, te rješavanje konkretnih problemskih i praktičnih zadataka.
Metode provjere znanja sa strukturom ocjene:	Kriterijum vrednovanja rada i ocjenjivanja studenta u toku nastave, vrši se na sljedeći način: Domaća zadaća/seminarski rad/projektni zadatak od 0 do 15 bodova (15%); Parcijalni ispit/ test/provjera znanja od 0 do 35 bodova (35%); Ukupan broj bodova koji student prema navedenom praćenju u toku nastave može ostvariti iznosi maksimalno 50 bodova (50%). Završni ispit od 0 do 50 bodova (50%). Da bi položio predmet student mora položiti (zadovoljiti) svaki od tri dijela zasebno (seminarski, parcijalni i završni ispit), te u ukupnom zbroju osvojiti minimalno 55 bodova (55%). Konačan uspjeh studenta nakon svih predviđenih oblika provjere znanja, vrednuje se i ocjenjuje sistemom ocjenjivanja kako slijedi: a) 10 (A) - izuzetan uspjeh bez grešaka ili sa neznatnim greškama, nosi 95-100 bodova; b) 9 (B) - iznad prosjeka, sa ponekom greškom, nosi 85-94,9 bodova; c) 8 (C) - prosječan, sa primjetnim greškama, nosi 75-84,9 bodova; d) 7 (D) - općenito dobar, ali sa značajnijim nedostacima, nosi 65-74,9 bodova; e) 6 (E) - zadovoljava minimalne uslove, nosi 55-64,9 bodova; f) 5 (F, FX) - ne zadovoljava minimalne uslove, 0 – 54,9 bodova. Ukupno vrednovanje svih obaveza studenta u toku semestra, odnosno ocjena na ispitu zasnovana je na ukupnom broju bodova (%) koje je student stekao ispunjavanjem predispitnih obaveza i polaganjem parcijalnog i završnog ispita, a prema kvalitetu stečenih znanja i vještina, i sadrži maksimalno 100 bodova, te se utvrđuje prema sljedećoj skali:

	Obaveze studenta Bodovi (%) Domaća zadaća/seminarski rad/projektni zadatak.....15 bodova (%) I Parcijalni ispit/Test/Provjera znanja/.....35 bodova (%) Završni ispit (II Parcijalni + Teorija) .....50 bodova (%)
Literatura:	Obavezna: • R.Dekker, M. Fleishmann, K. Inderfurth, Luk N. Van Wassenhove, Revese Logistics – Quantitative Models for Closed-Loop Supply Chains, Springer-Verlag Berlin Heidelberg, 2004. • Donald F. Blumberg, Introduction to Management of Reverse Logistics and Closed Loop Supply Chain Processes, CRC Press, Boca Raton, 2005. • Juan Pablo Zoto Zuluaga, Reverse logistics – Models and applications, Universitat Pompeu Fabra, 2005. • Dowlatshahi, Shad. "Developing a theory of reverse logistics." Interfaces 30.3 (2000): 143-155. • DEKKER, Rommert, et al. (ed.). Reverse logistics: quantitative models for closed-loop supply chains. Springer Science & Business Media, 2013. • DYCKHOFF, Harald; LACKES, Richard; REESE, Joachim (ed.). Supply chain management and reverse logistics. Springer Science & Business Media, 2013. • ROGERS, Dale S.; TIBBEN-LEMBKE, Ronald. An examination of reverse logistics practices. Journal of business logistics, 2001, 22.2: 129-148.

Šifra predmeta: 05CPTOS020101PL	Naziv predmeta: SIGURNOST I ZAŠTITA U POŠTANSKO-LOGISTIČKIM SISTEMIMA		
Ciklus: II	**Godina: I**	**Semestar: I**	**Broj ECTS kredita: 6**
Status: Obavezni predmet		**Ukupan broj sati: 90** Predavanja 45 Vježbe 30 Laboratorijske vježbe 15	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet** [u ovu rubriku ne unositi imena. Ostaviti formulaciju kako je naznačena u ovoj rubrici]		
Preduslov za upis:	NE		
Cilj (ciljevi) predmeta:	Ovladavanje stručnim znanjima kako što sigurnije, racionalnije i efikasnije dostaviti poštansku pošiljku, a pri tome obezbijediti kvalitet i kvantitet poštanskih pošiljaka. Usvajanje kompetencija za uspješnu procjenu da li pošiljka ispunjava sigurnosne uslove, organizaciju mjera za provjeru pošiljaka te predlaganje načina zaštite pošiljaka u pojedinim fazama prijenosa. Uspješna primjena metodologija i metoda kako da se smanji rizik i opasnost od neželjenih posljedica (orobljenja) poštanskih pošiljaka, kao i mjerama za borbu protiv poštanskog kriminala. Razumijevanje sistemskog pristupa u uspostavljanju sigurnosti i zaštite koja ima za cilj sigurnost osoblja i njihove aktivnosti od namjernog ili slučajnog neovlaštenog djelovanja sa ciljem nanošenje štete pojedincima ili organizacijama te njihovom ugledu.		
Tematske jedinice:	1. Uvod u predmet „Sigurnost i zaštita u poštansko-logističkim sistemima“ 2. Razvoj, ciljevi, predmet i metode sigurnosnih studija kao nastavne discipline (razvoj, ciljevi i metode). Zadaci i značaj sigurnosti i zaštite u poštanskom saobraćaju 3. Predmet proučavanja sigurnosti poštanskog i logističkog saobraćaja 4. Definicija, osnovna polazišta za organizaciju, uređivanje i provedbu zaštite 5. Opča načela zaštite i sigurnosti. Zaštita – nadzor i upravljanje sistemima zaštite, provjera valjanosti sistema 6. Vrste i izvori prijetnji u poštanskim i logističkim sistemima. Koncept zaštite objekata i pojedinih faza tehnološkog procesa. Planiranje tehničke zaštite 7. Sigurnost u obavljanju usluga i transportu		

	8. Zaštita jedinica složenim sistemom. Integralni sistem tehničke zaštit. 9. Zaštita kao važan pokazatelj kvaliteta usluge. Pokazatelji i mjerila kvalitete usluga (interna i eksterna kontrola) 10. Certifikati iz oblasti sigurnosti i zaštite 11. Organizacija i sadržaj kontrole. Kontrola i upravljanje kvalitetom 12. Efikasnost i racionalizacija u tehnološkom procesu (tehnološki proces, efikasnost i racionalizacija u tehnološkom procesu, pokazatelji efikasnosti i racionalizacije u tehnološkom procesu) 13. Tehnološka dostignuća u sigurnosti. Inteligentni transportni sistemi u praćenju pošiljaka i upravljanju voznim parkom 14. Zakonski propisi koji regulišu sigurnost u transportu i poštanskom saobraćaju u svijetu. Pravna regulativa u Bosni i Hercegovini sa aspekta zaštite poštanskog i logističkog sistema. Zakoni i pravni akti koji se odnose na sigurnost u BiH
Ishodi učenja:	Znanje: Teorijska i praktična znanja iz oblasti sigurnosti i zaštite u poštanskom i logističkom saobraćaju. Predmet proučavanja treba da osigura nivo kompetencija i znanja potrebnih za rješavanje svakodnevnih problema u oblasti sigurnosti i zaštite. Vještine: Sposobnost primjene teorijskih i praktičnih znanja iz oblasti sigurnosti i zaštite poštanskog i logističkog saobraćaja. Kompetencije: Sposobnosti samostalnog razumijevanja i korištenja znanja potrebnih za rješavanje specifičnih problema u oblasti sigurnosti i zaštite.
Metode izvođenja nastave:	Teorijski dio nastave pripremljen iz referentne literature prezentuje se upotrebom savremenih multimedijskih sredstava, uz podsticanje interaktivnosti u nastavi. Vježbe i laboratorijske vježbe održavaju se uz upotrebu savremenih softverskih alata u kompjuterskim laboratorijama fakulteta, te rješavanje konkretnih problemskih i praktičnih zadataka.
Metode provjere znanja sa strukturom ocjene:	Ocjena kreativnosti na nastavi i vježbama uz izradu samostalnih radova, ocjena parcijalnog testa u toku nastave kao i ocjena završnog ispita. Kriterijum praćenja rada i ocjenjivanja studenta u toku nastave i to prema sljedećem načinu: – Domaća zadaća/seminarski rad/praktični rad/ 15 bodova (%), položeno ako se osvoji preko 50 %. – I Parcijalni ispit/test/provjera znanja/35 bodova (%), položen je ako se osvoji preko 50 %. – Završni ispit (II Parcijalni) 50 bodova (%), položeno ako se osvoji preko 50 %. – Završni ispit (Integralni) 85 bodova (%), položeno ako se osvoji preko 50 %.

	Ukupan broj bodova (%) koji student prema navedenom praćenju u toku nastave može ostvariti iznosi maksimalno 50 bodova (%), što sa Završnim (II parcijalnim) čini 100 bodova (%). Za studente koji nisu položili I Parcijalni ispit, Završni ispit (Integralni) se organizuje iz cjelokupnog pređenog gradiva u toku nastave i vježbi, i vrednuje se sa 85 bodova (%), što sa seminarskim radom/praktičnim radom čini 100 bodova (%). Konačan uspjeh studenta nakon svih predviđenih oblika provjere znanja, vrednuje se i ocjenjuje sistemom ocjenjivanja kako slijedi: a) 10 (A) - izuzetan uspjeh bez grešaka ili sa neznatnim greškama, nosi 95-100 bodova; b) 9 (B) - iznad prosjeka, sa ponekom greškom, nosi 85-94 bodova; c) 8 (C) - prosječan, sa primjetnim greškama, nosi 75-84 bodova; d) 7 (D) - općenito dobar, ali sa značajnijim nedostacima, nosi 65-74 bodova; e) 6 (E) - zadovoljava minimalne uslove, nosi 55-64 bodova; f) 5 (F, FX) - ne zadovoljava minimalne uslove, manje od 55 bodova. Ukupno vrednovanje svih obaveza studenta u toku semestra, odnosno ocjena na ispitu zasnovana je na ukupnom broju bodova (%) koje je student stekao ispunjavanjem predispitnih obaveza i polaganjem parcijalnog i završnog ispita, a prema kvalitetu stečenih znanja i vještina, i sadrži maksimalno 100 bodova, te se utvrđuje prema sljedećoj skali: <u>Obaveze studenta Bodovi (%)</u> Prisutnost na predavanjima i vježbama. - Zadaća/Seminarski/Praksa/.....15 bodova (%) I Parcijalni ispit/Test/Provjera znanja/.....35 bodova (%) Završni ispit (II Parcijalni) .....50 bodova (%) Završni ispit (Integralni) .....85 bodova (%)

Literatura:	Obavezna: 1. Deljanin, A.: „Sigurnost i zaštita u poštanskom prometu“, Fakultet za saobraćaj i komunikacije, Sarajevo, 2011. 2. Arnautović, E.: „Tehnologija i tehnika poštanskih komunikacija“, Fakultet za saobraćaj i komunikacije, Univerzitet u Sarajevu, Sarajevo, 2003. 3. Arnautović, E.: „Tehnologija poštanskog saobraćaja“, Fakultet za saobraćaj i komunikacije, Sarajevo, 1998. 4. Bača, M.: „Uvod u računalnu sigurnost“, Narodne novine, 2004. 5. Bašić, N., Stoett, P.: „Sigurnosne studije u tranziciji“, prvo izdanje, Univerzitet u Bihaću, 2003. 6. Baručija, H.: „Priručnik za rad službe obezbjeđenja“, Sing Protekt, Sarajevo, 2001. 7. Beridan, I.: „Politika i sigurnost“, Fakultet političkih nauka, Sarajevo 2009. 8. Bošnjak, I.: „Kontrola poštanskog prometa“, Fakultet prometnih znanosti, Zagreb, 2004. 9. Bošnjak, I.: „Tehnologija poštanskog prometa I i II“, Fakultet prometnih znanosti, Zagreb, 1999. 10. Bošnjak, I.: „Inteligentni transportni sustavi I“, Sveučilište u Zagrebu, Fakultet prometnih zananosti, u Zagrebu, 2006. 11. Bukumirović, M.: „Automatizacija procesa rada u poštanskim sistemima“, Saobraćajni fakultet, Beograd, 1999. 12. Buzan, B., People States and Fear i The National Security Problem in International Relations, London, 1983. 13. Cerovac, V.: „Tehnika i sigurnost prometa“, Fakultet prometnih znanosti, Zagreb, 1997. Dopunska: 1. Delišimunović, D.: „Menadžment zaštite i sigurnosti“, I.T.Graf d.o.o, Zagreb, 2006. 2. Delišimunović, D.: „Suvremeni koncepti i uređaji zaštite“, I.T.Graf d.o.o, Zagreb, 2002. 3. Deljanin, A., Kiso, F.: „Saobraćajno komunikacijski sistemi“, Univerzitetski udžbenik, Univerzitet u Sarajevu, Fakultet za saobraćaj i komunikacije, Sarajevo 2016. godine 4. Golubić, J.: „Osnove tehnike i sigurnosti prometa“, Sveučilište u Zagrebu, Fakultet prometnih znanosti, Zagreb, 1992. 5. Grizold, A.: „Međunarodna sigurnost i etnički konflikt“, Politička misao, Zagreb, 1998. 6. Grizold, A.: „Međunarodna sigurnost“, FPZ, 1988. 7. Grupa autora, Stručni leksikon osnovnih vojnih i ratnih političko pravnih pojmova, Ministarstvo odbrane BiH, Sarajevo, 1996. 8. Gulan, N.: „Organizacija i eksplatacija poštanskog saobraćaja“, knjiga 1 i 2, ZJPTT, Beograd, 1982. 9. Hajrudin, E.: „Sigurnost prijenosa podataka“, Međunarodno savjetovanje o telekomunikacijama, Zbornik radova, Elektrotehnički fakultet, Sarajevo, 2000.

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19. Miodrag, Ž.: „Digitalni potpis“, Filozofski fakultet Sveučilišta u Zagrebu, Zagreb, 2005.
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24. Potemkin, Grizold A.: „Međunarodna sigurnost“, Zagreb, 1998.
25. Pravilnik o zaštiti ljudi i imovine u JP BH Pošta, Sarajevo
26. Priručnik sigurnosti pošte i operacija na aerodromima
27. Pravilnik o općim uvjetima za pružanje poštanskih usluga FBiH („Službene novine FBiH“ 4/07)
28. Posebni uslovi za vršenje poštanskih usluga (Sl.glasnik RS br.130/11)
29. Simić, I., Ružica.: „Fizičko-tehnička zaštita objekata“, Beograd, 1995.
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31. Univerzalni akti svjetskog poštanskog saveza
32. Svjetska poštanska konvencija
33. Zbirka propisa iz oblasti Zaštite ljudi i imovine u FBiH, Udruženje menadžera sigurnosti u BiH, Sarajevo, 2005.
34. Zakon o poštama Bosne i Hercegovine ("Sl. glasnik BiH" br. 33/05)

Šifra predmeta: 02CPTOS020101PL	Naziv predmeta: SIMULACIJE POŠTANSKO-LOGISTIČKIH SISTEMA I OPERACIJE		
Ciklus: I	**Godina: III**	**Semestar: VI**	**Broj ECTS kredita:** 6
Status: OBAVEZNI PREDMET		**Ukupan broj sati: 90** Razrada distribucije sati po tipu: Predavanja 45 Vježbe 30 Laboratorijske vježbe 15	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet** [u ovu rubriku ne unositi imena. Ostaviti formulaciju kako je naznačena u ovoj rubrici]		
Preduslov za upis:	NE		
Cilj (ciljevi) predmeta:	Razviti osnovna znanja i vještine iz oblasti modeliranja i simulacije statičkih i dinamičkih sistema, simulacijskih alata, upoznati funkcionalnosti aplikacija u upravljanju logističkim sistemima i operacijama. Uz praktično iskustvo analitičkih i modelskih aspekata primjene simulacije, obezbjeđuje alate za analizu ulaznih distribucija i procesi, metode za generisanje slučajnih brojeva i procesa, statistička analiza rezultata, dizajn eksperimenta i optimizacija simulacionih modela.		
Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)*	1. Pojam simulacije. Razlozi, prednosti i nedostaci procesa simuliranja. 2. Podjela, vrste i izbor tipa simulacijskih modela. 3. Analitičko *vs* simulacijsko modeliranje sistema. 4. Konceptualno modeliranje poštansko-logističkih sistema. 5. Funkcionalno dizajniranje poštansko - logističkih sistema. 6. Dizajniranje procesa (tehnički, organizacijski i informacioni sistem) 7. Simulacija za podršku dizajnu poštansko - logističkih sistema. 8. Modeliranje redova čekanja u poštansko – logističkim sistemima. 9. Tok i razvoj procesa simulacije. 10. Implementacija modela. 11. Validacija i verifikacija simulacijskog modela. 12. Analiza rezultata simulacije. 13. Simulacija proizvodnih operacija u poštansko – logističkim sistemima. 14. Simulacija upravljanja lancem snabdijevanja u poštansko – logističkim sistemima. 15. Simulacija upravljanja proizvodnjom s uključenim procesima automatizacije u poštansko – logističkim sistemima.		

Ishodi učenja:	Znanje: Teorijska i praktična znanja iz oblasti statistike i teorije vjerovatnoće koja se koristi za modeliranje poštansko logističkih sistema. Vještine: Sposobnost primjene teorijskih i praktičnih znanja za analizu inputa i rezultata, korištenjem principa simulacije vođene događajima, te mogućnost planiranje proizvodnje, transporta i distribucije, izbor dobavljača, konfiguraciju lanca snadbjevanja, usmjeravanje vozila, i slično. Kompetencije: Sposobnosti samostalnog razumijevanja i korištenja znanja za optimizaciju logističkih i proizvodnih sistema pomoću specifičnog simulacijskog alata, mogućnost analize i kritičkog osvrta na različita proizvodna i logistička rješenja.
Metode izvođenja nastave:	Nastava se realizira kroz izvođenje predavanja, vježbi, laboratorijskih vježbi/terenskog rada/prakse. Zastupljene su sljedeće metode: metoda usmenog izlaganja, metoda razgovora, metoda demonstracije, metoda grafičkih radova, metoda crtanja i metoda rada u skupini. Na predavanima se obrađuju teorijski koncepti i principi uz prikaz opisnih primjera i rješavanje određenih zadataka. Dodatni primjeri se razmatraju i rješavaju kroz vježbe, laboratorijske vježbe/terenski rad/praksu, što omogućava kontinuiran rad i pripremu za samostalno rješavanje problema. Na laboratorijskim vježbama/terenskom radu/praksi razvijat će se vještine potrebne za individualni i timski rad u cilju izvršavanja zadataka iz zadane oblasti.
Metode provjere znanja sa strukturom ocjene:	Ocjena kreativnosti na nastavi i vježbama uz izradu samostalnih radova, ocjena parcijalnog testa u toku nastave kao i ocjena završnog ispita. Kriterijum praćenja rada i ocjenjivanja studenta u toku nastave i to prema sljedećem načinu: – Domaća zadaća/seminarski rad/praktični rad/ 15 bodova (%), položeno ako se osvoji preko 50 %. – I Parcijalni ispit/test/provjera znanja/35 bodova (%), položen je ako se osvoji preko 50 %. – Završni ispit (II Parcijalni) 50 bodova (%), položeno ako se osvoji preko 50 %. – Završni ispit (Integralni) 85 bodova (%), položeno ako se osvoji preko 50 %.

	Ukupan broj bodova (%) koji student prema navedenom praćenju u toku nastave može ostvariti iznosi maksimalno 50 bodova (%), što sa Završnim (II parcijalnim) čini 100 bodova (%). Za studente koji nisu položili I Parcijalni ispit, Završni ispit (Integralni) se organizuje iz cjelokupnog pređenog gradiva u toku nastave i vježbi, i vrednuje se sa 85 bodova (%), što sa seminarskim radom/praktičnim radom čini 100 bodova (%). Konačan uspjeh studenta nakon svih predviđenih oblika provjere znanja, vrednuje se i ocjenjuje sistemom ocjenjivanja kako slijedi: a) 10 (A) - izuzetan uspjeh bez grešaka ili sa neznatnim greškama, nosi 95-100 bodova; b) 9 (B) - iznad prosjeka, sa ponekom greškom, nosi 85-94 bodova; c) 8 (C) - prosječan, sa primjetnim greškama, nosi 75-84 bodova; d) 7 (D) - općenito dobar, ali sa značajnijim nedostacima, nosi 65-74 bodova; e) 6 (E) - zadovoljava minimalne uslove, nosi 55-64 bodova; f) 5 (F, FX) - ne zadovoljava minimalne uslove, manje od 55 bodova. Ukupno vrednovanje svih obaveza studenta u toku semestra, odnosno ocjena na ispitu zasnovana je na ukupnom broju bodova (%) koje je student stekao ispunjavanjem predispitnih obaveza i polaganjem parcijalnog i završnog ispita, a prema kvalitetu stečenih znanja i vještina, i sadrži maksimalno 100 bodova, te se utvrđuje prema sljedećoj skali: <u>Obaveze studenta Bodovi (%)</u> Prisutnost na predavanjima i vježbama. - Zadaća/Seminarski/Praksa/.....15 bodova (%) I Parcijalni ispit/Test/Provjera znanja/.....35 bodova (%) Završni ispit (II Parcijalni) .....50 bodova (%) Završni ispit (Integralni) .....85 bodova (%)
Literatura:	**Obavezna**:

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Šifra predmeta: 06CPTOS020102PL	**Naziv predmeta: POSLOVNI MODELI KURIRSKIH SLUŽBI**		
Ciklus: II	**Godina:** I	**Semestar:** II	**Broj ECTS kredita:** 6 (ŠEST)
Status: OBAVEZAN PREDMET		**Ukupan broj sati: 90** Predavanja 45 Vježbe 30 Laboratorijske vježbe 15	

Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**
Preduslov za upis:	NE
Cilj (ciljevi) predmeta:	Predmet „Tehnologija kurirskih službi“ treba da osigura nivo znanja o svim načelima kurirskih službi poštanskog tržišta.
Tematske jedinice:	1. Pojam i definicija kurirskih službi. 2. Historijski osvrt na kurirsku službu. 3. Poslovni modeli kurirskih službi. 4. Tehnologija i organizacija kurirskih službi. 5. Tehnologija isporuke i dostave. 6. Tehnologija i informatička podrška u preuzimanju pošiljke na adresu pošiljatelja. 7. Procesi u centralnom uredu distribucijskog područja. 8. Odabir najpovoljnijeg vozila i optimizacija prevoza. 9. Komunikacija s vozilom i navigacija. 10. Praćenje pošiljaka na Internetu. 11. Analiza kvalitete usluga kurirske službe. 12. Daljinski nadzor vozila, vozača i tereta (pošiljki). 13. Koncept orjentacije na ekološka vozila. 14. Koncept izgadnje city logističkog terminala. 15. Koncept logističkog udruživanja kurirskih službi. 16. Logistički centri i terminali kurirske službe
Ishodi učenja:	Znanje: Studenti koji završe ovaj kolegij steći će znanje osnovna i dodatna znanja o kurirskim službama. Vještine: suradnju u učenju kroz rad u paru ili grupi, vještina prezentiranja, vještina istraživanja na zadanu temu Kompetencije: odgovarajuća osnovna i dodatna znanja o kurirskim službama. Predmet „Tehnologija kurirskih službi“ treba da osigura nivo znanja o svim načelima kurirskih službi poštanskog tržišta.

Metode izvođenja nastave:	Metoda usmenog izlaganja, metoda razgovora, metoda demonstracije, metoda rada u skupini
Metode provjere znanja sa strukturom ocjene:	Ocjena kreativnosti na nastavi i vježbama uz izradu samostalnih radova, ocjena parcijalnog testa u toku nastave kao i ocjena završnog ispita. Kriterijum praćenja rada i ocjenjivanja studenta u toku nastave i to prema sljedećem načinu: – Domaća zadaća/seminarski rad/praktični rad/ 15 bodova (%), položeno ako se osvoji najmanje 55 %. – I Parcijalni ispit/test/provjera znanja/35 bodova (%), položen je ako se osvoji najmanje 55 %. – Završni ispit (II Parcijalni) 50 bodova (%), položeno ako se osvoji najmanje 55 %. – Završni ispit (Integralni) 85 bodova (%), položeno ako se osvoji najmanje 55 %. Završni ispit se organizuje kao pismeni/usmeni. Student na završnom ispitu može da polaže gradivo koje nije polagao i/ili uspješno okončao tokom trajanja semestra. Potreban uslov za uspješno okončan ispit je postignut rezultat od najmanje 55% bodova od maksimalnog broja bodova na parcijalnom i završnom dijelu ispita, a dovoljan uslov je da suma ostvarenih bodova (kroz: domaću zadaću, prisustvo, parcijalni i završni ispit) bude 55. Zadaća se organizuje kroz pisanje domaće zadaće i projekata. Zadaća nema mogućnost popravljanja. Za studente koji nisu uspješno okončali parcijalni ispit, završni ispit se sastoji iz cjelokupnog pređenog gradiva u toku nastave. Popravni ispit se organizuje kao i završni ispit. Konačan uspjeh studenta nakon svih predviđenih oblika provjere znanja, vrednuje se i ocjenjuje sistemom ocjenjivanja kako slijedi: a) 10 (A) - izuzetan uspjeh bez grešaka ili sa neznatnim greškama, nosi 95-100 bodova; b) 9 (B) - iznad prosjeka, sa ponekom greškom, nosi 85-94 bodova; c) 8 (C) - prosječan, sa primjetnim greškama, nosi 75-84 bodova; d) 7 (D) - općenito dobar, ali sa značajnijim nedostacima, nosi 65-74 bodova; e) 6 (E) - zadovoljava minimalne uslove, nosi 55-64 bodova; f) 5 (F, FX) - ne zadovoljava minimalne uslove, manje od 55 bodova. Ukupno vrednovanje svih obaveza studenta u toku semestra, odnosno

	ocjena na ispitu zasnovana je na ukupnom broju bodova (%) koje je student stekao ispunjavanjem predispitnih obaveza i polaganjem parcijalnog i završnog ispita, a prema kvalitetu stečenih znanja i vještina, i sadrži maksimalno 100 bodova, te se utvrđuje prema sljedećoj skali: Obaveze studenta Bodovi (%) Prisutnost na predavanjima i vježbama... - Zadaća/Seminarski/Praksa/.....15 bodova (%) I Parcijalni ispit/Test/Provjera znanja/.....35 bodova (%) Završni ispit (II Parcijalni) .....50 bodova (%) Završni ispit (Integralni) .....85 bodova (%)
Literatura:	Obavezna: Deljanin, A., Sigurnost i zaštita u poštanskom prometu, Fakultet za saobraćaj i komunikacije, Sarajevo, 2011. Arnautović, E., Tehnologija poštanskog saobraćaja, Fakultet za saobraćaj i komunikacije, Sarajevo, 1998. Gulan, N. "Organizacija i eksploatacija poštanskog saobraćaja 2 "Saobraćajni fakultet Beograd Bošnjak, I., Tehnologija poštanskog prometa I i II, Fakultet prometnih znanosti, Zagreb, 1999. Kujačić Momčilo" Poštanske usluge i mreža" Fakultet tehničkih nauka, Novi Sad,2010 Dodatna: Kujačić Momčilo" Nove tehnologije i usluge u poštanskom saobraćaju" Fakultet tehničkih nauka, Novi Sad,2012 Slobodan Zečević, Snežana Tadić" City logistika" Saobraćajni fakultet,Univerzitet u Beogradu, Beograd,2013 http://www.postaltechnologyinternational.com/ http://www.upu.int/en.html www.postandparcel.info

Šifra predmeta: 07CPTOS020102PL	**Naziv predmeta: INFORMACIONE TEHNOLOGIJE I ŠPEDITERSKO POSLOVANJE**		
Ciklus: II	**Godina: I**	**Semestar: II**	**Broj ECTS kredita: 6**
Status: Obavezni predmet		**Ukupan broj sati: 90** Predavanja: 45 Vježbe: 30 Seminari i projektni zadaci: 15Laboratorijske vježbe 15	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet** [u ovu rubriku ne unositi imena. Ostaviti formulaciju kako je naznačena u ovoj rubrici]		
Preduslov za upis:	NE		
Cilj (ciljevi) predmeta:	Upoznavanje sa savremenim informacionim i komunikacijskim tehnologijama koje se primjenjuju u oblasti logističke špedicije, specifičnim softverskim alatima, te metodama i efektima njihove primjene.		
Tematske jedinice:	1. Uvod 2. Identifikacija tehnoloških procesa logističke špedicije 3. Identifikacija ključnih interesnih skupina u logističkom špediterskom lancu		

	4. Teoretske postavke aktuelnih informacionih tehnoloških rješenja koje se primjenjuju u oblasti špedicije 5. Značaj i mogućnosti primjene aplikativnih softvera u upravljanju sistema logističke špedicije i implementacija najboljih praksi 6. Metodološki pristupi u projektovanju informaciono-tehnoloških rješenja u logističkoj špediciji 7. Algoritmi špediterske narudžbe 8. Planiranje i optimiziranje šprditerske usluge- maksimiziranje korisnosti i snižavanje troškova procesa narudžbi, bukiranja i otpreme robe 9. Upravljanje procesima uvoza, izvoza i globalne vanjsko-trgovinske razmjene (harmonizirane tarife, ugovori o vanjskoj trgovini, INCOTERMS) 10. Softverske aplikacije za Business-to-Bussiness SCM (Supply Chain Management) 11. Softverske aplikacije za upravljanje carinskim procedurama bazirane na EU legislativi 12. Softverske aplikacije za upravljanje poslovima skladištenja 13. Softverske aplikacije zaupravljanje transportnim lancem 14. Web aplikacije i on-line usluge za vanjskotrgovinsku usklađenost, tarifske klasifikacije, uvozno-izvoznu dokumentaciju, elektronsko izvještavanje, verifikacija 15. Povezivanje segmentiranih softverskih aplikacija u holistički logističko-špediterski informacioni sistem (End-to-End Management)
Ishodi učenja:	Očekivani rezultati i stečene kompetencije Studenti kroz nastavni proces predavanja, vježbe, laboratorijske vježbe i praktičan rad trebaju steći odgovarajuća znanja i vještine za praktičnu primjenu kroz: razvoj IT i evaluaciju efekata njihove primjene u logističkoj špediciji, te samostalnu formulaciju ciljeva istraživanja i primjenu odgovarajućih metoda i modela za njihovu realizaciju; sistemski pristup u projektovanju IT poslovnih procesa logističke špedicije i razumijevanje algoritama kao osnove špediterskih softverskih rješenja; identifikaciju i korištenje relevantnih informacionih tehnoloških rješenja iz područja logističke špedicije, kritičku analizu, procjenu i sintezu raspoloživih znanja; razvoj i primjenu špediterskih softverskih upravljačkih modela, te prezentaciju stečenih znanja stručnoj i naučnoj javnosti.planira, upravlja i kontroliše realizaciju različitih tipova projekta u poslovnim sistemima.
Metode izvođenja nastave:	Tokom izvođenja programa nastavnik izlaže pojedine tematske jedinice (ex katedra), omogućava studentima praćenje video zapisa sa edukativnim sadržajem (DVD, video prezentacije) iz predmetne oblasti i organizuje

	diskusije na zadanu temu (interaktivna nastava). U okviru vježbi provodi se razmatranje i rješavanje primjera i zadataka sukladno teoretskoj tematici, pomaže se studentima u samostalnom rješavanju zadataka, u izradi programa, projekata i seminarskih radova.
Metode provjere znanja sa strukturom ocjene:	Ocjena kreativnosti na nastavi i vježbama kroz izradu zadaće/samostalnih radova/praktičnih radova, ocjena parcijalnog ispita u toku nastave kao i ocjena završnog/popravnog ispita. Kriterijum praćenja rada i ocjenjivanja studenta vrši se na sljedeći načinu: – Zadaća: 0 do 15 bodova (%); – I parcijalni ispit: 0 do 35 bodova (%); – Završni ispit: II parcijalni (0 do 50 bodova (%)) i/ili popravni I parcijalni (0 do 35 bodova (%)); Završni ispit se organizuje kao pismeni i/ili usmeni. Student na završnom ispitu može da polaže gradivo koje nije polagao i/ili uspješno okončao tokom trajanja semestra. Potreban uslov za uspješno okončan ispit je postignut rezultat od najmanje 55% bodova od maksimalnog broja bodova na I parcijalnom i završnom (II parcijalnom) dijelu ispita, a dovoljan uslov je da suma ostvarenih bodova (zadaća/praktični rad + I parcijalni + II parcijalni) bude 55. Za studente koji nisu uspješno okončali I parcijalni ispit, završni ispit se sastoji iz cjelokupnog pređenog gradiva u toku nastave. Popravni ispit se organizuje kao i završni ispit. Konačan uspjeh studenta nakon svih predviđenih oblika provjere znanja, vrednuje se i ocjenjuje sistemom ocjenjivanja kako slijedi: a) 10 (A) - izuzetan uspjeh bez grešaka ili sa neznatnim greškama, nosi 95-100 bodova; b) 9 (B) - iznad prosjeka, sa ponekom greškom, nosi 85-94 bodova; c) 8 (C) - prosječan, sa primjetnim greškama, nosi 75-84 bodova; d) 7 (D) - općenito dobar, ali sa značajnijim nedostacima, nosi 65-74 bodova; e) 6 (E) - zadovoljava minimalne uslove, nosi 55-64 bodova; f) 5 (F, FX) - ne zadovoljava minimalne uslove, manje od 55 bodova.
Literatura:	1. R. Zelenika: Logistička špedicija, Ekonomski fakultet, Zagreb, 2000.

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3. Ivanković, Č.: Špedicija i logistika, Fakultet prometnih znanosti, Zagreb, 2005.
4. R. Zelenika: Međunarodna špedicija, Ekonomski fakultet, Zagreb, 1996.
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6. Z. Aržek, G. Badovinac: Transport i osiguranje, Izdavačko-instruktivni biro, Zagreb, 1986.
7. J. Mađarić: Međunarodna špedicija, Fakultet prometnih znanosti, Zagreb, 1991.
8. I. Grabovac: Odgovornost poduzetnika multimodalnog prijevoza stvari, Prometni fakultet, Split, 1986.
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11. A. Deljanin: Logistika u saobraćaju i komunikacijama, Skripta, FSK, 2013.
12. A. Deljanin: Logistički sistemi, Skripta, FSK, 2014.

Šifra predmeta: 08CPTOS020102PL	**Naziv predmeta: LOKACIJSKI I NAVIGACIJSKI SISTEMI**		
Ciklus: II	**Godina: I**	**Semestar: II**	**Broj ECTS kredita:**6
Status: Obavezni predmet		**Ukupan broj sati: 90** Predavanja 45 Vježbe 30 Laboratorijske vježbe 15	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet** [u ovu rubriku ne unositi imena. Ostaviti formulaciju kako je naznačena u ovoj rubrici]		
Preduslov za upis:	NE		
Cilj (ciljevi) predmeta:	Cilj kursa je da upozna studente sa razlozima pojavljivanja, razvojem, primjenom i značajem LCS i LBS servisa. Kurs će obuhvatiti tehnike pozicioniranja korisnika u mrežama namjenjenim za komunikaciju i u mrežama razvijenim isključivo za pozicioniranje, te tehnike pozicioniranja u indoor i outdoor sistemima.		
Tematske jedinice:	1. Nastanak i terminologija u lokacijskim i navigacijskim sistemima 2. Klasifikacija metoda pozicioniranja 3. Standardizacija LCS servisa 4. Integrisane i samostalne metode pozicioniranja 5. Mobile based i network based metode pozicioniranja 6. Propagacija radio signala 7. Satelitske metode pozicioniranja 8. Metode pozicioniranja u ćelijskim radio sistemima 9. Indoor metode pozicioniranja (WLAN i Bluetooth) 10. Indoor metode pozicioniranja (Infrastrukturni sistemi, kamere, infracrvena tehnologija) 11. Algoritmi za određivanje lokacije korisnika 12. Pozicioniranje korisnika u LTE mrežama 13. Primjena lokacijskih i navigacijski sistema 14. Aspekti zaštite privatnosti i sigurnosti korisnika 15. Budućnosti LBS servisa. Korisnički zahtjevi i očekivanja.		
Ishodi učenja:	Studenti će biti upoznati sa tehničkim aspektima realizacije lokacijskih i navigacijskih servisa, tehnološkom podlogom, matematičkim metodama korištenim u pozicioniranju, procjenjivanjem preciznosti, troškova i izvodljivosti implementacije sistema lociranja i navigiranja korisnika, te odabirom idealne metode za pozicioniranje na određenom području		

	komparativnom analizom ključnih parametara.
Metode izvođenja nastave:	Teorijski dio nastave pripremljen iz referentne literature prezentuje se upotrebom savremenih multimedijskih sredstava, uz podsticanje interaktivnosti u nastavi. Vježbe i laboratorijske vježbe održavaju se uz upotrebu savremenih softverskih alata u kompjuterskim laboratorijama fakulteta, te rješavanje konkretnih problemskih i praktičnih zadataka.
Metode provjere znanja sa strukturom ocjene:	Kriterijum vrednovanja rada i ocjenjivanja studenta u toku nastave, vrši se na sljedeći način: Domaća zadaća/seminarski rad/projektni zadatak od 0 do 15 bodova (15%); Parcijalni ispit/ test/provjera znanja od 0 do 35 bodova (35%); Ukupan broj bodova koji student prema navedenom praćenju u toku nastave može ostvariti iznosi maksimalno 50 bodova (50%). Završni ispit od 0 do 50 bodova (50%). Da bi položio predmet student mora položiti (zadovoljiti) svaki od tri dijela zasebno (seminarski, parcijalni i završni ispit), te u ukupnom zbroju osvojiti minimalno 55 bodova (55%). Konačan uspjeh studenta nakon svih predviđenih oblika provjere znanja, vrednuje se i ocjenjuje sistemom ocjenjivanja kako slijedi: a) 10 (A) - izuzetan uspjeh bez grešaka ili sa neznatnim greškama, nosi 95-100 bodova; b) 9 (B) - iznad prosjeka, sa ponekom greškom, nosi 85-94,9 bodova; c) 8 (C) - prosječan, sa primjetnim greškama, nosi 75-84,9 bodova; d) 7 (D) - općenito dobar, ali sa značajnijim nedostacima, nosi 65-74,9 bodova; e) 6 (E) - zadovoljava minimalne uslove, nosi 55-64,9 bodova; f) 5 (F, FX) - ne zadovoljava minimalne uslove, 0 – 54,9 bodova. Ukupno vrednovanje svih obaveza studenta u toku semestra, odnosno ocjena na ispitu zasnovana je na ukupnom broju bodova (%) koje je student stekao ispunjavanjem predispitnih obaveza i polaganjem parcijalnog i završnog ispita, a prema kvalitetu stečenih znanja i vještina, i sadrži maksimalno 100 bodova, te se utvrđuje prema sljedećoj skali: Obaveze studenta _____Bodovi (%)_____

	Domaća zadaća/seminarski rad/projektni zadatak.....15 bodova (%) I Parcijalni ispit/Test/Provjera znanja/..35 bodova (%) Završni ispit (II Parcijalni + Teorija) .....50 bodova (%)
Literatura:	Obavezna: Nastavni materijal dostupan na web stranici Fakulteta za saobraćaj i komunikacije. Dopunska: 1. A. BENSKY: Wireless Positioning Technologies and Applications, Artech House, 2008. 2. R. MAUTZ: Indoor Positioning Technologies, Školska knjiga, Cirih, 2012. 3. J. FIGUEIRAS, S. FRATTASI: Mobile Positioning and Tracking, Wiley, 2010. 4. A. TANENBAUM, D. WETHERALL: Računarske mreže, Prevod petog izdanja, Mikro knjiga, 2012.

Šifra predmeta: 09-10-1CPTES020202PL	**Naziv predmeta: UPRAVLJANJE KVALITETOM U LOGISTICI**		
Ciklus: II	**Godina:** I	**Semestar:** II	**Broj ECTS kredita:** 6 (ŠEST)
Status: IZBORNI PREDMET		**Ukupan broj sati: 90** Predavanja 45 Vježbe 30 Laboratorijske vježbe 15	

Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**
Preduslov za upis:	NE
Cilj (ciljevi) predmeta:	Temeljni koncepti poslovanja utemeljeni na unapređenju kvalitete i njihova aplikacija u svakodnevnom poslovanju poštanskog operatera.
Tematske jedinice:	1. Uvod u područje kvalitete i upravljanja kvalitetom 2. Kvalitet u logistici 3. Mjerenje kvaliteta logističke usluge 4. Primjeri mjerenja kvaliteta logističkih usluga 5. Mjerenje zadovoljstva korisnika 6. Modeli odlučivanja o kvaliteti logističke usluge 7. Mjrenje indikatora performansi 8. Metode upravljanja kvalitetom 9. Benčmarking koncept 10. Standardi sistema menadžmenta kvalitetom 11. TQM koncept 12. HACCAP sistem 13. Integrisani menadžment sistemi
Ishodi učenja:	Znanje: Studenti koji završe ovaj kolegij steći će znanje o upravljanju kvalitetom u logistici Vještine: suradnju u učenju kroz rad u paru ili grupi, vještina prezentiranja, vještina istraživanja na zadanu temu Kompetencije: unapređenju kvalitete i njihova aplikacija u svakodnevnom poslovanju logističkih operatora.
Metode izvođenja nastave:	Metoda usmenog izlaganja, metoda razgovora, metoda demonstracije, metoda rada u skupini
Metode provjere znanja sa strukturom ocjene:	Ocjena kreativnosti na nastavi i vježbama uz izradu samostalnih radova, ocjena parcijalnog testa u toku nastave kao i ocjena završnog ispita.

	Kriterijum praćenja rada i ocjenjivanja studenta u toku nastave i to prema sljedećem načinu: – Domaća zadaća/seminarski rad/praktični rad/ 15 bodova (%), položeno ako se osvoji najmanje 55 %. – I Parcijalni ispit/test/provjera znanja/35 bodova (%), položen je ako se osvoji najmanje 55 %. – Završni ispit (II Parcijalni) 50 bodova (%), položeno ako se osvoji najmanje 55 %. – Završni ispit (Integralni) 85 bodova (%), položeno ako se osvoji najmanje 55 %. Završni ispit se organizuje kao pismeni/usmeni. Student na završnom ispitu može da polaže gradivo koje nije polagao i/ili uspješno okončao tokom trajanja semestra. Potreban uslov za uspješno okončan ispit je postignut rezultat od najmanje 55% bodova od maksimalnog broja bodova na parcijalnom i završnom dijelu ispita, a dovoljan uslov je da suma ostvarenih bodova (kroz: domaću zadaću, prisustvo, parcijalni i završni ispit) bude 55. Zadaća se organizuje kroz pisanje domaće zadaće i projekata. Zadaća nema mogućnost popravljanja. Za studente koji nisu uspješno okončali parcijalni ispit, završni ispit se sastoji iz cjelokupnog pređenog gradiva u toku nastave. Popravni ispit se organizuje kao i završni ispit. Konačan uspjeh studenta nakon svih predviđenih oblika provjere znanja, vrednuje se i ocjenjuje sistemom ocjenjivanja kako slijedi: a) 10 (A) - izuzetan uspjeh bez grešaka ili sa neznatnim greškama, nosi 95-100 bodova; b) 9 (B) - iznad prosjeka, sa ponekom greškom, nosi 85-94 bodova; c) 8 (C) - prosječan, sa primjetnim greškama, nosi 75-84 bodova; d) 7 (D) - općenito dobar, ali sa značajnijim nedostacima, nosi 65-74 bodova; e) 6 (E) - zadovoljava minimalne uslove, nosi 55-64 bodova; f) 5 (F, FX) - ne zadovoljava minimalne uslove, manje od 55 bodova. Ukupno vrednovanje svih obaveza studenta u toku semestra, odnosno ocjena na ispitu zasnovana je na ukupnom broju bodova (%) koje je student stekao ispunjavanjem predispitnih obaveza i polaganjem parcijalnog i završnog ispita, a prema kvalitetu stečenih znanja i vještina, i sadrži maksimalno 100 bodova, te se utvrđuje prema sljedećoj skali:

	Obaveze studenta Bodovi (%) Prisutnost na predavanjima i vježbama... - Zadaća/Seminarski/Praksa/.....15 bodova (%) I Parcijalni ispit/Test/Provjera znanja/.....35 bodova (%) Završni ispit (II Parcijalni) .....50 bodova (%) Završni ispit (Integralni) .....85 bodova (%)
Literatura:	Obavezna: 1. Kilibarda, M. J. i S. M. Zečević, Upravljanje kvalitetom u logistici, Saobraćajni fakultet, Beograd, 2008 2. Pejović, M. J. i Z. Krivokapić, Menadžment kvalitetom usluga, Pobjeda, Podgorica, 2007. Dodatna: 1. Lazibat, T., Upravljanje kvalitetom, Znanstvena knjiga, Zagreb, 2009. 2. Juran, J. M. i F. M. Gryna, F. M., Planiranje i analiza kvalitete, MATE, Zagreb, 1999. 3. Injac, N., Mala enciklopedija kvalitete, I., II. i III., Oskar, Zagreb, 2002. 4. Peters, T. i R. Waterman, U potrazi za izvrsnošću, Profil, Zagreb, 2008

Šifra predmeta: 09-10-2CPTES020202PL	**Naziv predmeta: MAŠINSKO UČENJE U LOGISTIČKIM SISTEMIMA**		
Ciklus: II	**Godina: I**	**Semestar: II**	**Broj ECTS kredita:** 6
Status: IZBORNI PREDMET		**Ukupan broj sati: 90** Predavanja 45 Vježbe 30 Laboratorijske vježbe 15	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet** [u ovu rubriku ne unositi imena. Ostaviti formulaciju kako je naznačena u ovoj rubrici]		
Preduslov za upis:	NE		
Cilj (ciljevi) predmeta:	Mašinsko učenje ima za cilj omogućiti kompjuterima da uče i ponašaju na način na koji to rade ljudi. Za to je potrebno osigurati podatke kao ulaz u algoritme mašinskog učenja koji će ih iskoristiti kako bi uspostavili veze i naučili kako da donose odluke i procjene sa određenim nivoom autonomije. Cilj predmeta je da se studenti osposobe za primjenu alata i tehnika mašinskog učenja u donošenju odluka za upravljenje logističkim procesima.		
Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)*	1. Osnovni koncepti Python programskog jezika 2. Tipovi podataka 3. Kontrolne strukture 4. Funkcije i moduli 5. Objektno-orjentisano programiranje 6. Osnovi nauke o podacima (manipulacija, analiza i vizualizacija) 7. NumPy, Pandas i Matplotlib biblioteke 8. Predprocesiranje i priprema podataka za algoritme mašinskog učenja 9. Regresione metode mašinskog učenja 10. Metode klasifikacije u mašinskom učenju 11. Metode klasterizacije u mašinskom učenju 12. Asocijativno učenje 13. Duboke neuralne mreže 14. Redukcija dimenzionalnosti 15. Praktični primjeri implementacije metoda mašinskog učenja u logističkim sistemima		
Ishodi učenja:	Znanje: Teorijska i praktična znanja iz oblasti mašinskog učenja. Materija predmeta treba da osigura poznavanje osnova programiranja i		

	koncepata mašinskog učenja. Vještine: Sposobnost primjene znanja o algoritmima mašinskog učenja u oblasti logističkih sistema. Kompetencije: Sposobnosti samostalnog prepoznavanja, analize i rješavanja problema u oblasti logističkih procesa korištenjem stečenih vještina i algoritama mašinskog učenja.
Metode izvođenja nastave:	Nastava se realizira kroz izvođenje predavanja, vježbi, laboratorijskih vježbi/terenskog rada/prakse. Zastupljene su sljedeće metode: metoda usmenog izlaganja, metoda razgovora, metoda demonstracije, metoda grafičkog i softverskog prikaza, kao i metoda rada u skupini. Na predavanima se obrađuju teorijski koncepti i principi uz prikaz opisnih primjera i rješavanje određenih zadataka. Dodatni primjeri se razmatraju i rješavaju kroz vježbe i rad u odgovarajućim softverskim alatima, laboratorijske vježbe/terenski rad/praksu, što omogućava kontinuiran rad i pripremu za samostalno rješavanje problema. Na laboratorijskim vježbama/terenskom radu/praksi razvijat će se vještine potrebne za individualni i timski rad u cilju izvršavanja zadataka iz zadane oblasti.
Metode provjere znanja sa strukturom ocjene:	Ocjena kreativnosti na nastavi i vježbama uz izradu samostalnih radova, ocjena parcijalnog testa u toku nastave kao i ocjena završnog ispita. Kriterijum praćenja rada i ocjenjivanja studenta u toku nastave i to prema sljedećem načinu: – Domaća zadaća/seminarski rad/praktični rad/ 15 bodova (%), položeno ako se osvoji preko 50 %. – I Parcijalni ispit/test/provjera znanja/35 bodova (%), položen je ako se osvoji preko 50 %. – Završni ispit (II Parcijalni) 50 bodova (%), položeno ako se osvoji preko 50 %. Ukupan broj bodova (%) koji student prema navedenom praćenju u toku nastave može ostvariti iznosi maksimalno 50 bodova (%), što sa Završnim (II parcijalnim) čini 100 bodova (%). Za studente koji nisu položili I Parcijalni ispit ili Završni ispit se organizuje iz popravni ispit na kojem je potrebno položiti oba dijela ispita sa ostvarenih najmanje 50% bodova.

	Konačan uspjeh studenta nakon svih predviđenih oblika provjere znanja, vrednuje se i ocjenjuje sistemom ocjenjivanja kako slijedi: a) 10 (A) - izuzetan uspjeh bez grešaka ili sa neznatnim greškama, nosi 95-100 bodova; b) 9 (B) - iznad prosjeka, sa ponekom greškom, nosi 85-94 bodova; c) 8 (C) - prosječan, sa primjetnim greškama, nosi 75-84 bodova; d) 7 (D) - općenito dobar, ali sa značajnijim nedostacima, nosi 65-74 bodova; e) 6 (E) - zadovoljava minimalne uslove, nosi 55-64 bodova; f) 5 (F, FX) - ne zadovoljava minimalne uslove, manje od 55 bodova. Ukupno vrednovanje svih obaveza studenta u toku semestra, odnosno ocjena na ispitu zasnovana je na ukupnom broju bodova (%) koje je student stekao ispunjavanjem predispitnih obaveza i polaganjem parcijalnog i završnog ispita, a prema kvalitetu stečenih znanja i vještina, i sadrži maksimalno 100 bodova, te se utvrđuje prema sljedećoj skali: <u>Obaveze studenta Bodovi (%)</u> Prisutnost na predavanjima i vježbama. - Zadaća/Seminarski/Praksa/.....15 bodova (%) I Parcijalni ispit/Test/Provjera znanja/.....35 bodova (%) Završni ispit (II Parcijalni) .....50 bodova (%)
Literatura:	Obavezna: • C. Müller and S. Guido, “Introduction to machine learning with Python: a guide for data scientists”, O'Reilly Media, 2016. • S. Shalev-Shwartz and S. Ben-David, “Understanding machine learning: from theory to algorithms”, Chambridge University Press, 2014. • Kosovac, A., Muharemović, E., Begović, M., & Šimić, E. (2020). Determining the location of postal centers in B&H using machine learning clustering method and GIS. In 2020 43rd International Convention on Information, Communication and Electronic Technology (MIPRO) (pp. 1318-1322). IEEE. Dopunska: • Géron, “Hands-On Machine Learning With Scikit-Learn, Keras, And TensorFlow: Concepts, Tools, And Techniques To Build Intelligent Systems Aurélien Géron-pdf download free book Hands-On Machine Learning With Scikit-Learn,” 2019.

	• R. Johansson, "Numerical python: Scientific computing and data science applications with numpy, SciPy and matplotlib, Second edition," Numer. Python Sci. Comput. Data Sci. Appl. with Numpy, SciPy Matplotlib, Second Ed., 2018. • X. S. Yang, "Introduction to algorithms for data mining and machine learning,", 2019. • "Overview — NumPy v1.21 Manual." [Online]. Dostupno: https://numpy.org/doc/stable/. [Accessed: 07-Sep-2021]. • "pandas documentation — pandas 1.3.2 documentation." [Online]. Dostupno: https://pandas.pydata.org/docs/. [Accessed: 07-Sep-2021]. • "Matplotlib: Python plotting — Matplotlib 3.4.3 documentation." • • "scikit-learn: machine learning in Python — scikit-learn 0.24.2 documentation." [Online]. Dostupno: https://scikit-learn.org/stable/. [Accessed: 07-Sep-2021]. • Avdagić-Golub, E., Begović, M., Čaušević, S., & Kosovac, A. (2021, March). Profiling Contact Center Customers for Optimization of Call Routing Using Data Mining Techniques. In 2021 20th International Symposium INFOTEH-JAHORINA (INFOTEH) (pp. 1-4). IEEE. • Avdagić-Golub, E., Begović, M., & Kosovac, A. (2020). Optimization of Agent-User Matching Process Using A Machine Learning Algorithms. TEM Journal, 9(1), 158-163.

Šifra predmeta: 09-10-3CPTES020202PL	**Naziv predmeta: NAPREDNO MODELIRANJE U LOGISTICI**		
Ciklus: II	**Godina: I**	**Semestar: II**	**Broj ECTS kredita:** 6
Status: IZBORNI PREDMET		**Ukupan broj sati: 90** Predavanja: 45 Vježbe: 30 Seminari i projektni zadaci: 15	

Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet** [u ovu rubriku ne unositi imena. Ostaviti formulaciju kako je naznačena u ovoj rubrici]
Preduslov za upis	Ne
Cilj (ciljevi) predmeta:	Dati studentima znanja koja se odnose na koncepte i metode rješavanja problema modeliranja procesa i optimizacije u poštansko-logističkim sistemima, sa posebnim naglaskom na rješavanje transportnih problema koji su prisutni u tim sistemima.
Tematske jedinice:	– Osnovni pojmovi modeliranja. Pregled matematičkih metoda za opis dinamičkih sistema. – Vrste modeliranja. Primjeri logističkog modeliranja. – Modeli i metode operacionih istraživanja. Matematički modeli u zadacima operacionih istraživanja. Matematički modeli u postupku vrednovanja i odlučivanja. Primjena metoda višekriterijumske analize. – Transportni problem u skladištima, sistemima za upravljanje lancima snadbijevanja. – Teorija grafova. Osnovni pojmovi u teoriji grafova. Primjena teorije grafova na optimizaciju poštansko-logističkih procesa.
Ishodi učenja:	Znanje: Student nakon odslušanog i položenog kursa treba da raspolaže osnovnim teorijskim znanjima neophodnim za primjenu različitih metoda modeliranja i optimizacije, sa primjenom na poštansko-logističke sisteme. Vještine: Sa znanjima stečenim na ovom predmetu student će biti u mogućnosti da sagleda ulogu i značaj modeliranja i optimizacije za proces donošenja odluka i koristi koja se njihovom primjenom mogu ostvariti. Kompetencije: Studenti se osposobljavaju za modeliranje optimizacionih problema korištenjem odgovarajućih metodologija u cilju rješavanja raznih realnih problema iz poštansko-logističkih sistema uz pomoć računara.
Metode izvođenja nastave:	Nastava se realizira kroz izvođenje predavanja, vježbi i praktičnog dijela nastave koji uključuje laboratorijske vježbe/terenski rad/praksu. Predavanja se realizuju kroz usmeno izlaganje sa prezentacijom, tokom kojih se predstavljaju teorijski aspekti uz rješavanje numeričkih problema i praktičnih primjera. Na auditornim vježbama se rješavaju i diskutuju konkretni problemi. Na laboratorijskim vježbama se implementiraju i demonstriraju algoritmi obrađeni na predavanjima. Rješavaju se klase problema obrađenih na predavanjima. Za realizaciju

	će se koristiti Matlab/Simulink.
Metode provjere znanja sa strukturom ocjene:	Ocjenjivanje studenta u toku nastave vrši se na sljedeći način: Aktivnost (seminarski rad / projektni zadatak/zadaće): od 0 do 15 bodova; I test / I provjera znanja / I parcijalni ispit: od 0 do 35 bodova. Ukupan broj bodova koji studenta prema navedenom praćenju u toku nastave može ostvariti iznosi maksimalno 50 bodova. Završni / popravni ispit uključuje gradivo koje student nije položio na parcijalnom ispitu što znači da obuhvata drugi dio gradiva (II parcijalni) koji se vrednuje sa 35 bodova i 15 bodova usmeni ispit koji se sastoji od kompletnog gradiva (I i II parcijalnog ispita, a koje nije student polagao na parcijalnom i završnom ispitu). Ukupno vrednovanje svih obaveza studenta u toku semestra, odnosno ocjena na ispitu zasnovana je na ukupnom broju bodova (%) koje je student stekao ispunjavanjem predispitnih obaveza i polaganjem parcijalnog i završnog ispita. Prema kvalitetu stečenih znanja i vještina student može osvojiti maksimalno 100 bodova, a prema sljedećoj skali: Struktura bodovanja Bodovi (%) Seminarski / Projektni zadatak:..... 15 bodova (%) I test / I provjera znanja (I parcijalni ispit):..... 35 bodova (%) Završni ili popravni ispit (II parcijalni ispit + Usmeni):..... (35+15) 50 bodova (%) Potreban uslov za polaganje ispita je postignut rezultat od najmanje 50% od bodova predviđenim aktivnostima parcijalni ispit i završni ispit tj. da bi student položio ispit mora ostvariti sljedeće: - I test / I provjera znanja / parcijalni ispit: 17.50 bodova - Završni ili popravni ispit (II parcijalni ispit): 17.50 bodova Studenti koji su položili parcijalni ispit, na završnom ispitu polažu samo drugi dio gradiva (dio koji nije obuhvaćen parcijalnim ispitom). Studenti koji nisu položili parcijalni ispit, u okviru završnog / popravnog ispita polažu i gradivo sa parcijalnog ispita na način da se ispit organizuje iz cjelokupnog pređenog gradiva u toku nastave (dva dijela), pri čemu su kriteriji za polaganje ispita ostaju identični. Završni ispit se organizuje kao pismeni i/ili usmeni uz praktični dio.

	Aktivnost studenta se prati i ocijenjuje kroz učestvovanje u diskusijama na nastavi, izradu zadaća, seminarskih radova, projektnih zadataka ili polaganje kvizova. Konačan uspjeh studenta, nakon svih predviđenih oblika provjere znanja, vrednuje se i ocjenjuje sistemom kako slijedi: a) 10 (A) - izuzetan uspjeh bez grešaka ili sa neznatnim greškama (95-100 bodova); b) 9 (B) - iznad prosjeka, sa ponekom greškom (85-94 bodova); c) 8 (C) - prosječan, sa primjetnim greškama (75-84 bodova); d) 7 (D) - općenito dobar, ali sa značajnijim nedostacima (65-74 bodova); e) 6 (E) - zadovoljava minimalne uslove (55-64 bodova); f) 5 (F, FX) - ne zadovoljava minimalne uslove (manje od 55 bodova). Navedena skala ocjenjivanja se može korigovati prema Pravilima studiranja na Univerzitetu u Sarajevu (Član 45).
Literatura:	Osnovna: – Husein Pašagić, Matematičko modeliranje i teorija grafova, FPZ, Zagreb, 1998. – D. Lipovac, D. Letić, Metode operacionih istraživanja, Univerzitet u Novom Sadu, Zrenjanin, 1999. – Corne, D., Dorigo, M., Glover, F.: New Ideas in Optimization, Mc Graw Hill, 1999 Crainic, T.G., Laporte, G.: Fleet Managment and Logistics, Kluwer, 1998 Dopunska: – Damir Vučina, Metode inženjerske numeričke optimizacije, FESB, Split, 2005. – Dr. Jovan J.Petrić, Operaciona istraživanja, Knjiga prva, Savremena administracija, V izdanje, 1979. – Dr. Jovan J.Petrić, Operaciona istraživanja, Knjiga druga, Savremena administracija, V izdanje, 1979. – Dr. Aleksandar Zečević, Operaciona istraživanja, Viša poslovna škola Beograd, 2000. cnd

Šifra predmeta: 11CPTOS020203PL	**Naziv predmeta: IOT U POŠTANSKO-LOGISTIČKIM SISTEMIMA**		
Ciklus: II	**Godina: II**	**Semestar: III**	**Broj ECTS kredita:** 6
Status: OBAVEZNI PREDMET		**Ukupan broj sati: 90** Razrada distribucije sati po tipu: Predavanja: 45 Vježbe: 30 Seminari i projektni zadaci: 15	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet** [u ovu rubriku ne unositi imena. Ostaviti formulaciju kako je naznačena u ovoj rubrici]		
Preduslov za upis	Ne		
Cilj (ciljevi) predmeta:	Upoznavanje sa IoT tehnologijama i mogućnostima njihove primjene u poštansko-logističkim sistemima. Poseban fokus je na analizi primjene navedenih tehnologija za razvoj pametnih rješenja i automatizaciju procesa u skladištima i upravljanje lancima snadbijevanja.		
Tematske jedinice:	– Upoznavanje sa konceptom IoT (*Internet of Things*) – IoT arhitektura, infrastruktura i tehnologije – Senzori i hardverske platforme – Komunikacijske tehnologije – Cloud tehnologije i servisi – IoT sistemi za pametni nadzor – IoT sistemi u skladištima – IoT sistemi za upravljanje lancima snadbijevanja – IoT sistemi za automatizaciju procesa u logistici – Izazovi primjene IoT tehnologija u poštansko-logističkim sistemima – Perspektive i razvoj IoT rješenja u poštansko-logističkim sistemima		
Ishodi učenja:	**Znanje:** Studenti će se upoznati sa IoT paradigmom i tehnologijama sa posebnim fokusom na mogućnosti i izazove njihove primjene u poštansko-logističkim sistemima. **Vještine:** Studenti će savladati određene alate potrebne za projektovanje i razvoj IoT sistema uključujući softverske alate, konfigurciju mreže i hardvera. **Kompetencije:** Nakon položenog ispita student će biti u mogućnosti planirati, projektovati i razvijati IoT sisteme za unaprijeđenje procesa u poštansko-logističkim sistemima uz odabir odgovarajućih tehnologija za razvoj specifičnih rješenja.		
Metode izvođenja nastave:	Nastava se realizira kroz izvođenje predavanja, vježbi, i praktičnog dijela nastave koji uključuje laboratorijske vježbe/terenski rad/praksu.		

	Predavanja se realizuju kroz usmeno izlaganje sa prezentacijom i prikazom primjera iz prakse. Tokom realizacije nastave se inicira diskusija o problemima projektovanja sistema baziranih na IoT tehnologijama. Studenti će biti obavezni izraditi i prezentirati seminarske radove i/ili projektne zadatake. U toku nastave se koriste različite metode koje uključuju: usmeno izlaganje, razgovori diskusije, demonstracije, individualni i grupni rad.
Metode provjere znanja sa strukturom ocjene:	Ocjenjivanje studenta u toku nastave vrši se na sljedeći način: Aktivnost (seminarski rad / projektni zadatak): od 0 do 15 bodova; I test / I provjera znanja / I parcijalni ispit: od 0 do 35 bodova. Ukupan broj bodova koji studenta prema navedenom praćenju u toku nastave može ostvariti iznosi maksimalno 50 bodova. Završni / popravni ispit uključuje gradivo koje student nije položio na parcijalnom ispitu što znači da obuhvata drugi dio gradiva (II parcijalni) koji se vrednuje sa 50 bodova ili se sastoji od kompletnog gradiva (I i II parcijalnog ispita). Ukupno vrednovanje svih obaveza studenta u toku semestra, odnosno ocjena na ispitu zasnovana je na ukupnom broju bodova (%) koje je student stekao ispunjavanjem predispitnih obaveza i polaganjem parcijalnog i završnog ispita. Prema kvalitetu stečenih znanja i vještina student može osvojiti maksimalno 100 bodova, a prema sljedećoj skali: Struktura bodovanja Bodovi (%) Seminarski / Projektni zadatak:..... 15 bodova (%) I test / I provjera znanja (I parcijalni ispit):..... 35 bodova (%) Završni ili popravni ispit (II parcijalni ispit):..... 50 bodova (%) Potreban uslov za polaganje ispita je postignut rezultat od najmanje 55% od bodova predviđenim na svim aktivnostima (seminarski rad i / ili projektni zadatak, parcijalni ispit, završni ispit), tj. da bi student položio ispit mora ostvariti sljedeće: - Aktivnost (seminarski rad / projektni zadatak): 9 bodova - I test / I provjera znanja / parcijalni ispit: 19 bodova - Završni ili popravni ispit (II parcijalni ispit): 27 bodova Studenti koji su položili parcijalni ispit, na završnom ispitu polažu samo drugi dio gradiva (dio koji nije obuhvaćen parcijalnim ispitom). Studenti

	koji nisu položili parcijalni ispit, u okviru završnog / popravnog ispita polažu i gradivo sa parcijalnog ispita na način da se ispit organizuje iz cjelokupnog pređenog gradiva u toku nastave (dva dijela), pri čemu su kriteriji za polaganje ispita ostaju identični. Završni ispit se organizuje kao pismeni i/ili usmeni uz praktični dio. Aktivnost studenta se prati i ocijenjuje kroz učestvovanje u diskusijama na nastavi, izradu zadaća, seminarskih radova, projektnih zadataka ili polaganje kvizova. Konačan uspjeh studenta, nakon svih predviđenih oblika provjere znanja, vrednuje se i ocjenjuje sistemom kako slijedi: a) 10 (A) - izuzetan uspjeh bez grešaka ili sa neznatnim greškama (95-100 bodova); b) 9 (B) - iznad prosjeka, sa ponekom greškom (85-94 bodova); c) 8 (C) - prosječan, sa primjetnim greškama (75-84 bodova); d) 7 (D) - općenito dobar, ali sa značajnijim nedostacima (65-74 bodova); e) 6 (E) - zadovoljava minimalne uslove (55-64 bodova); f) 5 (F, FX) - ne zadovoljava minimalne uslove (manje od 55 bodova). Navedena skala ocjenjivanja se može korigovati prema Pravilima studiranja na Univerzitetu u Sarajevu (Član 45).
Literatura:	Osnovna: – A. Čolaković, "*Napredne internet tehnologije (SKRIPTA),"* Fakultet za saobraćaj i komunikacije, Sarajevo, 2020. Dopunska: – A. Čolaković and M. Hadžialić, "Internet of Things (IoT): A review of enabling technologies, challenges, and open research issues," *Computer Networks*, vol. 144, pp. 17-39, 2018. – A. Čolaković, S. Čaušević, A. Kosovac, E. Muharemović: "A Review of Enabling Technologies and Solutions for IoT Based Smart Warehouse Monitoring System," *International Conference "New Technologies, Development and Applications*," Springer, Cham, Juni 2020. – Y. Song, Y. R. F, Z. Li, X. Yang i Z. He, "Applications of the Internet of Things (IoT) in Smart Logistics: A Comprehensive Survey", *IEEE Internet of Things Journal*, vol. 8, no. 6, 2021.

	– Wei Liu and Zhijun Gao, "Study on IOT based Architecture of Logistics Service Supply Chain," *International Journal of Grid and Distributed Computing*, Vol.7, No.1, pp. 169-178, 2014. – B. Sai Subrahmany Tejesh, S.Neeraja, "Warehouse inventory management system using IoT and open source framework," *Alexandria Engineering Journal*, Vol. 57, No. 4, pp. 3817-3823, 2018. – M. El Midaoui, E. M. B. Laoula, M. Qbadou i K. Mansouri, "Logistics tracking system based on decentralized IoT and blockchain platform", *Indonesian Journal of Electrical Engineering and Computer Science*, vol. 23, no. 1, pp. 421-430, 2021. – S. Čaušević, A. Čolaković and A. Hasković, "The model of transport monitoring application based on Internet of Things," in *International Scientific Conference on Science and Traffic Development (ZIRP)*, Opatija, Croatia, 2018.

Šifra predmeta: 12CPTOS020203PL	Naziv predmeta: SAOBRAĆAJNA POLITIKA		
Ciklus: II	**Godina: II**	**Semestar: III**	**Broj ECTS kredita: 6**
Status: Izborni predmet		**Ukupan broj sati: 90** Predavanja: 45 Vježbe: 30 Seminari i projektni zadaci: 15	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet** [u ovu rubriku ne unositi imena. Ostaviti formulaciju kako je naznačena u ovoj rubrici]		
Preduslov za upis:	NE		
Cilj (ciljevi) predmeta:	**Studenti stiču osnovna teorijska znanja potrebna za izučavanje prometne politike:** nacionalni značaj poštanskog prometna i integracija u europske prometne tokove, alokacija pozitivnih i negativnih učinaka integracije poštanske prometne politike. Piramidalna struktura i ingerencija prilikom definisanja i realizacije poštanskih prioriteta na nacionalnom i međunardonom nivou.		
Tematske jedinice:	1. Pristupne osnove nacionlanoj prometnoj politici: pojam politike, vrste politike, funkcija politike kao pristupna osnova nacionalne prometne politike, 2. Komponente nacionalne prometne politike: Nositelji prometne politike, ciljevi prometne politike, instrumenti prometne politike, odnos ciljeva i instrumenata prometne politike, 3. Načela nacionalne prometne politike – I dio: povezanosti prometa i ekonomije, usklađivanja djelovanja prometnog sustava i društvene rentabilnosti. 4. Načela nacionalne prometne politike – II dio: Načela jedinstvenog prometnog sustava, alokacije resursa, vlasništva i jednakih mogućnosti rada, izbora prometne politike i ostvarivosti prometne politike 5. Formuliranje prometne politike: Formuliranje, vrednovanje, efikasnost nacionalne prometne politike. Pojam i značenje determinanata prometne politike. 6. Usklađenost prometne politike – I dio: Ciljevi zajedničke prometne politike. Opće političke smjernice zajedničke prometne politike. 7. Usklađenost prometne politike – II dio: Primjena i rasprave o budućnosti prometa u okviru zajedničke prometne politike.		

	8. Transeuropska prometne mreža – I dio: Smjernice iz 1996. i revizija smjernica za transeuropsku prometnu mrežu iz 2004. godine. 9. Transeuropska prometne mreža – II dio: Revizija smjernica iz 2013. godine: integrirana mreža, dvoslojna struktura i koridori transeuropske prometne mreže. 10. Transeuropska prometne mreža – III dio: Dodatne mogućnosti financiranja projekata transeuropskih mreža. Utvrđivanje općih uvjeta za financiranje projekata transeuropskih mreža. 11. Transeuropska prometne mreža – IV dio: Instrument i opći ciljevi za povezivanje europe transeuropskom mrežom. Proračun Instrumenta za povezivanje Europe transeuropskom mrežom 12. Sektorske politike EU – I dio: Cilj i područje primjene Direktive 97/67/EZ europskog Parlamenta i Vijeća. Univerzalne poštanske usluge. 13. Sektorske politike EU – II dio: Usklađenje poštanskih usluga koje se mogu rezervirati. Uvjeti pružanja nerezerviranih poštanskih usluga i pristupa u mrežu. 14. Sektorske politike EU – III dio: Kvaliteta poštanskih usluga. Usklađenje tehničkih normi prema interesima korisnika. Odbor i nacionalno regulatorno tijelo 15. Sektorske politike EU – IV dio: Tržišna pravila poštanskog prometa i europska postignuća u oblasti poštanskog prometa.
Ishodi učenja:	Znanje: Kreiranje uspješne prometne politike Vještine: Strateško planirnje i kreiranje prometnu politiku u mikro i makro okruženju, definisati ciljeve prometne politike i model realizacije, identifikuje prioritete u oblasti planiranja, izgradnje, revitalizacije prometnih tokova, izvrši procjenu potrebe za integracijom i liberalizacijom unutrašnjih prometnih tokova prateći europsku prometnu politiku, direktive i smjernice kao i prometne tokove, ali i prometne tokove i politike zemalja u okruženju. Kompetencije: identifikacija i organizacija efikasnog i efektivnog prometnog sistema
Metode izvođenja nastave:	Usmeno iznošenje sa prezentacijom i prikazom različitih sistema i procesa iz oblasti saobraćajne politike i komunikacijama uz korištenje video i audio zapisa, te samostalno izlaganje pojedinih konkretnih problema u oblasti prometne politike na konkretnom području istraživanja. Iniciranje rasprava i diskusija sa studentima o proble mima

	iz prakse, pojedinačnih zapažanja iz različitih okruženja, izrada samostalnih istraživanja i analiza iz oblasti saobraćajne politike
Metode provjere znanja sa strukturom ocjene:	Ocjena kreativnosti na nastavi i vježbama uz izradu samostalnih radova, ocjena parcijalnog testa u toku nastave kao i ocjena završnog ispita. Kriterijum praćenja rada i ocjenjivanja studenta u toku nastave i to prema sljedećem načinu: – Domaća zadaća/seminarski rad/praktični rad/ 15 bodova (%), položeno ako se osvoji preko 50 %. – I Parcijalni ispit/test/provjera znanja/35 bodova (%), položen je ako se osvoji preko 50 %. – Završni ispit (II Parcijalni) 50 bodova (%), položeno ako se osvoji preko 50 %. – Završni ispit (Integralni) 85 bodova (%), položeno ako se osvoji preko 50 %.
Literatura:	Obavezna: 1. Juraj Padjen, Prometne politikaHrvatske, Masmedia, Zagreb 2003. godina. 2. Piero Soave, „Kratak vodić o Europskoj uniji“, Eurospki parlament, oktobar 2016. godine. 3. Marc Thomas, „Kratak vodić o Europskoj uniji“, Eurospki parlament, septembar 2016. godina. 4. Beata Tuszynska i Frederic Gouarderes, „Kratak vodić o Europskoj uniji“, Eurospki parlament, oktobar 2016. Godine. Dopunska: 1. Direktiva 97/67/EZ EUROPSKOG PARLAMENTA I VIJEĆA OD 15.12.1997. godine, „Službeni list Europskih zajednica“ br. 6/Sv. 9 od 21.01.1998. godine. 2. Direktiva 2002/39/EZ EUROPSKOG PARLAMENTA I VIJEĆA OD 10.06.2002. godine, „Službeni list Europskih zajednica“ br. 6/Sv. 1 od 05.07.2002. godine. 3. Direktiva 2008/6/EZ EUROPSKOG PARLAMENTA I VIJEĆA od 20.02.2008. godine o izmjeni i Direktiva 97/67/EZ u pogledu potpunog postizanja unutarnjeg tržišta poštanskih usluga u Zajednici, „Službeni list Europskih zajednica“ br. 06/Sv. 9 od 27.02.2008. godine. 4. Bilješke i slajdovi s predavanja (mogu se preuzeti sa službene internet stranice Fakulteta za saobraćaj i komunikacije i elektronska

	distribucija svakom pojedinačnom studentu)

Šifra predmeta: 13CPTOS020203PL	Naziv predmeta: UPRAVLJANJE ODNOSIMA S KORISNICIMA		
Ciklus: II	**Godina: II**	**Semestar: III**	**Broj ECTS kredita: 6**
Status: Obavezni predmet		**Ukupan broj sati: 90** Predavanja 45 Vježbe 30 Laboratorijske vježbe 15	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet** [u ovu rubriku ne unositi imena. Ostaviti formulaciju kako je naznačena u ovoj rubrici]		
Preduslov za upis:	NE		
Cilj (ciljevi) predmeta:	Studenti trebaju u okviru predmeta da steknu potrebna znanja, teorijska i praktična, za rad na poslovima upravljanja odnosima s korisnicima. Osnovni cilj je razumijevanje važnosti korisnika i odnosa koji se sa njima izgrađuju, kao i načina na koji je moguće upravljati tim odnosima.		
Tematske jedinice:	1. Uvod u upravljanje odnosima sa korisnicima (CRM): Pojam i definicija CRM – a. Potreba za CRM. 2. Evolucijski razvoj marketinškog upravljanja 3. Pristupi istraživanju zadovoljstva klijenata. Projektiranje i izgradnja procesa kontinuiranog praćenja zadovoljstva klijenata. Orijentacija na kupce kao kultura tvrtke. 4. Upravljanje odnosima s klijentima kao poslovni proces. Proces upravljanja odnosima s klijentima. Koristi i troškovi upravljanja odnosima s klijentima. Procjena spremnosti tvrtke za uvođenje upravljanja odnosima s klijentima. Organiziranje i integriranje poslovanja, zaposlenika, tehnologije i procesa. Strategije komunikacije u marketingu. Prikupljanje podataka o klijentima. 5. Upravljanje odnosima s klijentima kao poslovni proces. Predviđanje ponašanja klijenata. Segmentiranje klijenata. Profitabilnost klijenata. Personalizacija i optimiziranje komunikacijskih kanala. Modeliranje interakcije s klijentima. Automatiziranje procesa u marketingu i prodaji. Planiranje programa upravljanja odnosima s klijentima. 6. Politika odnosa sa klijentima: Definisanje upravljanja odnosima s klijentima. Važnost poznavanja kupaca. Stjecanje novih klijenata naprema zadržavanju postojećih. Lojalnost klijenata. Korištenje podataka o klijentima. 7. Analitički CRM 8. Alati upravljanja odnosima sa korisnicima 9. Tehnološka osnovica upravljanju odnosima s klijentima: Tehnološka osnovica upravljanja odnosima s klijentima.		

	Skladištenje podataka. Analiza podataka o kupcima i rudarenja podataka 10. Elektroničko poslovanje i upravljanje odnosima s kupcima putem Interneta. Dodatne usluge kupcima putem World Wide Weba. Pitanja privatnosti kupaca. Izbor alata za CRM. 11. Životni ciklus CRM sistema. Modeliranje i implementacija CRM sistema u telekomunikacijskim kompanijama. 12. Reinžinjering CRM sistema. 13. Implementacija CRM rješenja u telekomunikacijskim kompanijama (Implementacija strategije, Implementacija tehnologije). 14. Operativni CRM 15. CRM u praksi, stanje u BiH i okruženju
Ishodi učenja:	Znanje: Teorijska i praktična znanja iz oblasti upravljanje odnosima s korisnicima. Predmet proučavanja treba da osigura nivo kompetencija i znanja potrebnih za rješavanje svakodnevnih problema u navedenoj oblasti. Vještine: Sposobnost primjene teorijskih i praktičnih znanja iz oblasti upravljanje odnosima s korisnicima. Kompetencije: Sposobnosti samostalnog razumijevanja i korištenja znanja potrebnih za rješavanje specifičnih problema u oblasti upravljanje odnosima s korisnicima.
Metode izvođenja nastave:	Nastava se realizira kroz izvođenje predavanja, vježbi, laboratorijskih vježbi/terenskog rada/prakse. Zastupljene su sljedeće metode: metoda usmenog izlaganja, metoda razgovora, metoda demonstracije, metoda grafičkih radova, metoda crtanja i metoda rada u skupini. Na predavanima se obrađuju teorijski koncepti i principi uz prikaz opisnih primjera i rješavanje određenih zadataka. Dodatni primjeri se razmatraju i rješavaju kroz vježbe, laboratorijske vježbe/terenski rad/praksu, što omogućava kontinuiran rad i pripremu za samostalno rješavanje problema. Na laboratorijskim vježbama/terenskom radu/praksi razvijat će se vještine potrebne za individualni i timski rad u cilju izvršavanja zadataka iz zadane oblasti.
Metode provjere znanja sa strukturom ocjene:	Ocjena kreativnosti na nastavi i vježbama uz izradu samostalnih radova, ocjena parcijalnog testa u toku nastave kao i ocjena završnog ispita. Kriterijum praćenja rada i ocjenjivanja studenta u toku nastave i to

	prema sljedećem načinu: – Domaća zadaća/seminarski rad/praktični rad/ 15 bodova (%), položeno ako se osvoji preko 50 %. – I Parcijalni ispit/test/provjera znanja/35 bodova (%), položen je ako se osvoji preko 50 %. – Završni ispit (II Parcijalni) 50 bodova (%), položeno ako se osvoji preko 50 %. – Završni ispit (Integralni) 85 bodova (%), položeno ako se osvoji preko 50 %. Ukupan broj bodova (%) koji student prema navedenom praćenju u toku nastave može ostvariti iznosi maksimalno 50 bodova (%), što sa Završnim (II parcijalnim) čini 100 bodova (%). Za studente koji nisu položili I Parcijalni ispit, Završni ispit (Integralni) se organizuje iz cjelokupnog pređenog gradiva u toku nastave i vježbi, i vrednuje se sa 85 bodova (%), što sa seminarskim radom/praktičnim radom čini 100 bodova (%). Konačan uspjeh studenta nakon svih predviđenih oblika provjere znanja, vrednuje se i ocjenjuje sistemom ocjenjivanja kako slijedi: a) 10 (A) - izuzetan uspjeh bez grešaka ili sa neznatnim greškama, nosi 95-100 bodova; b) 9 (B) - iznad prosjeka, sa ponekom greškom, nosi 85-94 bodova; c) 8 (C) - prosječan, sa primjetnim greškama, nosi 75-84 bodova; d) 7 (D) - općenito dobar, ali sa značajnijim nedostacima, nosi 65-74 bodova; e) 6 (E) - zadovoljava minimalne uslove, nosi 55-64 bodova; f) 5 (F, FX) - ne zadovoljava minimalne uslove, manje od 55 bodova. Ukupno vrednovanje svih obaveza studenta u toku semestra, odnosno ocjena na ispitu zasnovana je na ukupnom broju bodova (%) koje je student stekao ispunjavanjem predispitnih obaveza i polaganjem parcijalnog i završnog ispita, a prema kvalitetu stečenih znanja i vještina, i sadrži maksimalno 100 bodova, te se utvrđuje prema sljedećoj skali: <u>Obaveze studenta Bodovi (%)</u> Prisutnost na predavanjima i vježbama. - Zadaća/Seminarski/Praksa/.....15 bodova (%) I Parcijalni ispit/Test/Provjera znanja/.....35 bodova (%)

	Završni ispit (II Parcijalni) .....50 bodova (%) Završni ispit (Integralni) .....85 bodova (%)
Literatura:	Obavezna: 1. Materijal sa predavanja (dostupan na stranici fakulteta) 2. Dyche, J., Diche, J. (2001). The CRM handbook: A business guide to customer relationship management. Addison-Wesley 3. Greenberg, P. (2002). CRM at the speed of light: Capturing and keeping customers in Internet real time. Osborne McGraw-Hill. 4. Peelen, E.: Customer Relationship Management, Pearson Education Limited, Essex, 2005 5. Buttle, F. Customer Relationship Management. 2nd ed., Butterworth-Heinmann, Amsterdam, London, 2009.

Šifra predmeta: 14-15-1CPTES020203PL	**Naziv predmeta: UPRAVLJANJE PROJEKTIMA I INVESTICIJAMA U SAOBRAĆAJU I KOMUNIKACIJAMA**		
Ciklus: II	**Godina:** II	**Semestar:** III	**Broj ECTS kredita: 6**
Status: Izborni predmet		**Ukupan broj sati: 90** Predavanja 45 Vježbe 30 Laboratorijske vježbe 15	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet** [u ovu rubriku ne unositi imena. Ostaviti formulaciju kako je naznačena u ovoj rubrici]		
Preduslov za upis:	NE		
Cilj (ciljevi) predmeta:	Osnovni ciljevi predmeta se ogledaju u sticanju znanja iz oblasti upravljanja projektima i investicijama, razumjevanju metoda i tehnika koje se primjenjuju u procesima upravljanja projektima i investicijama, te osposobljavanju studenata za praktičnu primjenu znanja iz ove oblasti.		
Tematske jedinice:	1. **Opšti pojmovi investicija**: Pojam i definisanje investicija. Vrste investicija u saobraćaju. 2. **Priprema investicionih projekata:** Prethodna studija opravdanosti. Studija opravdanosti. 3. **Ocjena studije opravdanosti:** Finansijska ocjena. Nacionalna ocjena. Ocjena investicija u uslovima neizvjesnosti. 4. **Cost – Benefit analiza**: Principi cost-benefit analize. Utvrđivanje troškova i koristi. Vrednovanje troškova i koristi. Kriterijumi koji se koriste u cost-benefit analizi. Primjene cost-benefit analize. 5. **Biznis plan:** Pojam biznis plana. Sadržaj biznis plana. 6. **Unido metodologija:** Priprema industrijskih projekata. Ocjena industrijskih projekata. **7. Ocjena investicionih projekata od strane Svjetske banke:** Globalna procedura razmatranja i ocjene investicionih projekata. Ocjena rentabilnosti projekata. **8. Upravljanje projektima:** Koncept upravljanja projektima. Organizacija za upravljanje projektom. **9. Standardni računarski programi za upravljanje projektima** **10. Primjena koncepta upravljanja projektima u saobraćaju**		

	11. **Realizacija projekta:** Planiranje realizacije projekta. Planiranje vremena. Planiranje troškova i resursa. 12. **Praćenje i kontrola realizacije projekta:** Praćenje i kontrola vremena realizacije projekta. Praćenje i kontrola resursa i troškova realizacije projekta. 13. **Upravljanje promjenama u projektu** 14. **Upravljanje rizicima u projektu** 15. **Izvještaj**: Sistem izvještavanja o realizaciji projekta. Zatvaranje projekta.
Ishodi učenja:	Nakon završetka kursa studenti će biti sposobni da: • razumije procese upravljanja projektima i investicijama, • procijeni odgovarajuće metode u procesu upravljanja projektima, • procijeni odgovarajuće metode u procesu upravljanja investicijama, • planira aktivnosti za oba procesa, • primjeni koncept upravljanja određenim projektom u realnom sistemu i poslovnom okruženju • primjeni koncept upravljanja investicijskim aktivnostima u realnom sistemu i poslovnom okruženju • planira, upravlja i kontroliše realizaciju različitih tipova projekta u poslovnim sistemima.
Metode izvođenja nastave:	Tokom izvođenja programa nastavnik izlaže pojedine tematske jedinice (ex katedra), omogućava studentima praćenje video zapisa sa edukativnim sadržajem (DVD, video prezentacije) iz predmetne oblasti i organizuje diskusije na zadanu temu (interaktivna nastava). U okviru vježbi provodi se razmatranje i rješavanje primjera i zadataka sukladno teoretskoj tematici, pomaže se studentima u samostalnom rješavanju zadataka, u izradi programa, projekata i seminarskih radova.
Metode provjere znanja sa strukturom ocjene:	Ocjena kreativnosti na nastavi i vježbama kroz izradu zadaće/samostalnih radova/praktičnih radova, ocjena parcijalnog ispita u toku nastave kao i ocjena završnog/popravnog ispita. Kriterijum praćenja rada i ocjenjivanja studenta vrši se na sljedeći načinu: – Zadaća: 0 do 15 bodova (%); – I parcijalni ispit: 0 do 35 bodova (%); – Završni ispit: II parcijalni (0 do 50 bodova (%)) i/ili popravni I parcijalni (0 do 35 bodova (%));

	Završni ispit se organizuje kao pismeni i/ili usmeni. Student na završnom ispitu može da polaže gradivo koje nije polagao i/ili uspješno okončao tokom trajanja semestra. Potreban uslov za uspješno okončan ispit je postignut rezultat od najmanje 55% bodova od maksimalnog broja bodova na I parcijalnom i završnom (II parcijalnom) dijelu ispita, a dovoljan uslov je da suma ostvarenih bodova (zadaća/praktični rad + I parcijalni + II parcijalni) bude 55. Za studente koji nisu uspješno okončali I parcijalni ispit, završni ispit se sastoji iz cjelokupnog pređenog gradiva u toku nastave. Popravni ispit se organizuje kao i završni ispit. Konačan uspjeh studenta nakon svih predviđenih oblika provjere znanja, vrednuje se i ocjenjuje sistemom ocjenjivanja kako slijedi: a) 10 (A) - izuzetan uspjeh bez grešaka ili sa neznatnim greškama, nosi 95-100 bodova; b) 9 (B) - iznad prosjeka, sa ponekom greškom, nosi 85-94 bodova; c) 8 (C) - prosječan, sa primjetnim greškama, nosi 75-84 bodova; d) 7 (D) - općenito dobar, ali sa značajnijim nedostacima, nosi 65-74 bodova; e) 6 (E) - zadovoljava minimalne uslove, nosi 55-64 bodova; f) 5 (F, FX) - ne zadovoljava minimalne uslove, manje od 55 bodova.
Literatura:	1. Bilješke i slajdovi s predavanja (moći će se preuzeti na WEB site-u Fakulteta). 2. Vujadin Vešović, „Upravljanje projektima“, 9. Izdanje, Beograd, 2010. 3. Petar Jovanović, “Upravljanje investicijama”, 8. izdanje, Beograd, 2013

Šifra predmeta: 14-15-2CPTES020203PL	**Naziv predmeta: KOMUNIKACIJSKE TEHNOLOGIJE I OKOLIŠ**		
Ciklus: II	**Godina: II**	**Semestar: III**	**Broj ECTS kredita: 6**
Status: Izborni predmet		**Ukupan broj sati: 90**	

	Predavanja 45 Vježbe 30 Laboratorijske vježbe 15
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**
Preduslov za upis:	NE
Cilj (ciljevi) predmeta:	Ovaj kolegij omogućit će studentima potrebna znanja iz oblasti komunikacijskih tehnologija i njegovoj interakciji sa okolinom, uticaju tk.tehnologija na zdravlje ljudi, radom Međunarodnih agencija za zaštitu okoliša, Evropskim Direktivama u pogledu elektronskog otpada, kao i o nastanku, upotrebi i zbrinjavanju elektronskog otpada.
Tematske jedinice:	1. EKOLOŠKI ASPEKTI ZAŠTITE OKOLIŠA Koncept upravljanja znanjem. Akvizicija i pohranjivanje sustavskog znanja. Ekologija sustavskog znanja. 2. EKOLOŠKI ASPEKTI ZAŠTITE OKOLIŠA Globalno zagrijavanje. Opasne supstance koje oštećujuu ozonski omotač. 3. MEĐUNARODNE ORGANIZACIJE ZA ZAŠTITU OKOLIŠA. 4. TELEKOMUNIKACIJSKE PROMET U INTERAKCIJI SA OKOLINOM Nove tehnologije u oblasti tk. prometa. Ekološka politika i savremeni trendovi telekomunikacija. 5. TELEKOMUNIKACIJSKE PROMET U INTERAKCIJI SA OKOLINOM Stanje i perspektive razvoja tk. tehnologija u prometu kao posljedica održivog razvoja. Zeleni IT. 6. SAVREMENI TRENDOVI U PROIZVODNJI ICT OPREME. Ekološki aspekti u proizvodnji i korištenju ICT opreme. Preporuke za održivo korištenje. 7. EVROPSKE DIREKTIVE U POGLEDU ELEKTRONSKOG OTPADA WEEE Direktiva o električnom i elektronskom otpadu. RoHS Direktiva o ograničenjima za upotrebu opasnih materija 8. UTICAJ ELEKTROMAGNETNOG ZRAČENJA NA ZDRAVLJE LJUDI. Termički i netermički učinci zračenja. Prodiranje elektromagnetnih talasa u organizam. 9. MEĐUNARODNI SPORAZUMI O KLIMATSKIM PROMJENAMA POTPISANI U KYOTU I MONTREALU.

	10. NASTANAK I UPOTREBA ELEKTRONSKOG OTPADA. 11. NAČIN ZBRINJAVANJA ELEKTRONSKOG OTPADA. 12. SUSTAV UPRAVLJANJA OKOLIŠEM. 13. POSTUPANJE S ELEKTRONSKIM OTPADOM U BIH. 14. ICNIRP STANDARD. 15. SAR MJERENJA.
Ishodi učenja:	Znanje: Studenti kroz nastavni proces će ovladati predmetnom tematikom nakon čega će biti osposobljeni da donose odluke bitne prvenstveno za zaštitu ljudskog zdravlja od utjecaja tk. tehnolgija. Vještine: Sposobnost primjene teorijskih i praktičnih znanja i prepoznavanje ključnih problema i sposobnost rješavanja istih Kompetencije: Studenti koji završe ovaj kolegij steći će kompentacije koje se odnose na mogućnosti prepoznavanja I rješavanja problema zasnovan na evropskim direktivama i korištenju metoda koje doprinose zaštiti okoliša i zdravlja ljudi od utjecaja savremenih tehnologija.
Metode izvođenja nastave:	Metoda usmenog izlaganja, metoda razgovora, metoda demonstracije, metoda rada u skupini.
Metode provjere znanja sa strukturom ocjene:	Ocjena kreativnosti na nastavi i vježbama uz izradu samostalnih radova, ocjena parcijalnog testa u toku nastave kao i ocjena završnog ispita. Kriterijum praćenja rada i ocjenjivanja studenta u toku nastave i to prema sljedećem načinu: – Domaća zadaća/seminarski rad/praktični rad/ 15 bodova (%), položeno ako se osvoji najmanje 55 %. – I Parcijalni ispit/test/provjera znanja/35 bodova (%), položen je ako se osvoji najmanje 55 %. – Završni ispit (II Parcijalni) 50 bodova (%), položeno ako se osvoji najmanje 55 %. – Završni ispit (Integralni) 85 bodova (%), položeno ako se osvoji najmanje 55 %. Završni ispit se organizuje kao pismeni/usmeni. Student na završnom ispitu može da polaže gradivo koje nije polagao i/ili uspješno okončao tokom trajanja semestra. Potreban uslov za uspješno okončan ispit je postignut rezultat od najmanje 55% bodova od maksimalnog broja bodova na parcijalnom i završnom dijelu ispita, a dovoljan uslov je da suma ostvarenih bodova (kroz: domaću zadaću, prisustvo, parcijalni i završni ispit) bude 55. Zadaća se organizuje kroz pisanje domaće zadaće i projekata. Zadaća nema mogućnost popravljanja. Za studente koji nisu uspješno okončali parcijalni

	ispit, završni ispit se sastoji iz cjelokupnog pređenog gradiva u toku nastave. Popravni ispit se organizuje kao i završni ispit. Konačan uspjeh studenta nakon svih predviđenih oblika provjere znanja, vrednuje se i ocjenjuje sistemom ocjenjivanja kako slijedi: a) 10 (A) - izuzetan uspjeh bez grešaka ili sa neznatnim greškama, nosi 95-100 bodova; b) 9 (B) - iznad prosjeka, sa ponekom greškom, nosi 85-94 bodova; c) 8 (C) - prosječan, sa primjetnim greškama, nosi 75-84 bodova; d) 7 (D) - općenito dobar, ali sa značajnijim nedostacima, nosi 65-74 bodova; e) 6 (E) - zadovoljava minimalne uslove, nosi 55-64 bodova; f) 5 (F, FX) - ne zadovoljava minimalne uslove, manje od 55 bodova. Ukupno vrednovanje svih obaveza studenta u toku semestra, odnosno ocjena na ispitu zasnovana je na ukupnom broju bodova (%) koje je student stekao ispunjavanjem predispitnih obaveza i polaganjem parcijalnog i završnog ispita, a prema kvalitetu stečenih znanja i vještina, i sadrži maksimalno 100 bodova, te se utvrđuje prema sljedećoj skali: Obaveze studenta Bodovi (%) Prisutnost na predavanjima i vježbama... - Zadaća/Seminarski/Praksa/.....15 bodova (%) I Parcijalni ispit/Test/Provjera znanja/.....35 bodova (%) Završni ispit (II Parcijalni) .....50 bodova (%) Završni ispit (Integralni) .....85 bodova (%)
Literatura:	1. Čaušević S, KOMUNIKACIJSKE TEHNOLOGIJE I OKOLIŠ, Univerzitet u Sarajevu, Fakultet za saobraćaj i komunikacije, Sarajevo, 2006. 2. Bilješke i prezentacije sa predavanja i vježbi.

Šifra predmeta: 14-15-3CPTES020203PL	**Naziv predmeta: METODOLOGIJA ISTRAŽIVAČKOG I NAUČNOG RADA**		
Ciklus: II	**Godina: II**	**Semestar: III**	**Broj ECTS kredita: 6**
Status: Izborni predmet		**Ukupan broj sati: 90** Predavanja: 45 Vježbe: 30 Seminari i projektni zadaci: 15	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet**		

	pripada/predmet [u ovu rubriku ne unositi imena. Ostaviti formulaciju kako je naznačena u ovoj rubrici]
Preduslov za upis:	NE
Cilj (ciljevi) predmeta:	Studenti kroz nastavni proces predavanja, vježbe, seminarski rad i praktičan rad trebaju steći odgovarajuća osnovna i dodatna znanja iz oblasti metodologije naučnog i stručnog rada. Predmet „metodologija istraživačkog i naučnog rada“ treba da osigura nivo znanja o svim načelima, metodama, ciljevima, instrumentima istraživačkog i naučnog rada kao i način definisanja i implementacije izrade naučnih i stručnih radova.
Tematske jedinice:	1. Uvod u metodologiju istraživačkog rada. Funkcija istraživačkog rada. 2. Znanost o naukama. Definicija znanosti. 3. Osnovna obilježja znanosti. 4. Funkcije znanosti – istraživački rad : Fundamentalna istraživanja. 5. Primjenjena istraživanja. Razvojna istraživanja. Individualna i timska istraživanja. 6. Osnovne metode istraživanja. 7. Klasifikacija i selekcija metoda. 8. Tehnologija istraživačkog rada uočavanje istraživačkog problema i njegova funkcija. 9. Izbor i analiza teme 10. Sastavljanje radne bibliografije : priručnici, enciklopedije, rječnici, monografije. 11. Kako se definira predmet i cilj istraživanja? 12. Šta je istraživački rezultat i kako se verificira? 13. Pisanje i prezentacija izvještaja istraživačkog rada. 14. Koncept.uvod, izlaganje problema, argumentacija i diskusija rezultata. 15. Pitanje izbora metode istraživanja. 16. Pisanje magistarskih radova.
Ishodi učenja:	Znanje: Teorijska i praktična znanja iz oblasti naučne i istraživačke djelatnosti. Predmet proučavanja treba da osigura nivo kompetencija i znanja potrebnih za rješavanje svakodnevnih problema u navedenoj oblasti. Vještine: Sposobnost primjene teorijskih i praktičnih znanja iz oblasti naučne i istraživačke djelatnosti. Kompetencije: Sposobnosti samostalnog razumijevanja i korištenja znanja potrebnih za rješavanje specifičnih problema u oblasti naučne i istraživačke djelatnosti.

Metode izvođenja nastave:	Nastava se realizira kroz izvođenje predavanja, vježbi, laboratorijskih vježbi/terenskog rada/prakse. Zastupljene su sljedeće metode: metoda usmenog izlaganja, metoda razgovora, metoda demonstracije, metoda grafičkih radova, metoda crtanja i metoda rada u skupini. Na predavanima se obrađuju teorijski koncepti i principi uz prikaz opisnih primjera i rješavanje određenih zadataka. Dodatni primjeri se razmatraju i rješavaju kroz vježbe, laboratorijske vježbe/terenski rad/praksu, što omogućava kontinuiran rad i pripremu za samostalno rješavanje problema. Na laboratorijskim vježbama/terenskom radu/praksi razvijat će se vještine potrebne za individualni i timski rad u cilju izvršavanja zadataka iz zadane oblasti.
Metode provjere znanja sa strukturom ocjene:	Ocjena kreativnosti na nastavi i vježbama uz izradu samostalnih radova, ocjena parcijalnog testa u toku nastave kao i ocjena završnog ispita. Kriterijum praćenja rada i ocjenjivanja studenta u toku nastave i to prema sljedećem načinu: – Domaća zadaća/seminarski rad/praktični rad/ 15 bodova (%), položeno ako se osvoji preko 50 %. – I Parcijalni ispit/test/provjera znanja/35 bodova (%), položen je ako se osvoji preko 50 %. – Završni ispit (II Parcijalni) 50 bodova (%), položeno ako se osvoji preko 50 %. – Završni ispit (Integralni) 85 bodova (%), položeno ako se osvoji preko 50 %. Ukupan broj bodova (%) koji student prema navedenom praćenju u toku nastave može ostvariti iznosi maksimalno 50 bodova (%), što sa Završnim (II parcijalnim) čini 100 bodova (%). Za studente koji nisu položili I Parcijalni ispit, Završni ispit (Integralni) se organizuje iz cjelokupnog pređenog gradiva u toku nastave i vježbi, i vrednuje se sa 85 bodova (%), što sa seminarskim radom/praktičnim radom čini 100 bodova (%). Konačan uspjeh studenta nakon svih predviđenih oblika provjere znanja, vrednuje se i ocjenjuje sistemom ocjenjivanja kako slijedi: a)

	10 (A) - izuzetan uspjeh bez grešaka ili sa neznatnim greškama, nosi 95-100 bodova; b) 9 (B) - iznad prosjeka, sa ponekom greškom, nosi 85-94 bodova; c) 8 (C) - prosječan, sa primjetnim greškama, nosi 75-84 bodova; d) 7 (D) - općenito dobar, ali sa značajnijim nedostacima, nosi 65-74 bodova; e) 6 (E) - zadovoljava minimalne uslove, nosi 55-64 bodova; f) 5 (F, FX) - ne zadovoljava minimalne uslove, manje od 55 bodova. Ukupno vrednovanje svih obaveza studenta u toku semestra, odnosno ocjena na ispitu zasnovana je na ukupnom broju bodova (%) koje je student stekao ispunjavanjem predispitnih obaveza i polaganjem parcijalnog i završnog ispita, a prema kvalitetu stečenih znanja i vještina, i sadrži maksimalno 100 bodova, te se utvrđuje prema sljedećoj skali: <u>Obaveze studenta Bodovi (%)</u> Prisutnost na predavanjima i vježbama. - Zadaća/Seminarski/Praksa/.....15 bodova (%) I Parcijalni ispit/Test/Provjera znanja/.....35 bodova (%) Završni ispit (II Parcijalni) .....50 bodova (%) Završni ispit (Integralni) .....85 bodova (%)
Literatura:	Obavezna: 1. Š. Čekić: Osnovi metodologije i tehnologije izrade znanstvenog i stručnog djela, Fakultet za saobraćaj i komunikacije, Sarajevo, 1999 2. S. Dubić: Uvođenje u naučni rad, Zavod za izdavanje udžbenika, Sarajevo 1970. 3. M.Šamić: Kako nastaje naučno djelo, Svjetlost, Sarajevo,1980. 4. M.Vujović: Uvođenje u znanstveni rad, Informator, Zagreb, 1983 5. M. Filipović: Metodologija znanosti i znanstvenog rada,Svjetlost, Sarajevo 2004. 6. V. Silubrčić: Kako sastaviti, obajaviti i ocjeniti znanstveno djelo, Zagreb, 2003. 7. L. Kuba – Dž. Koking: Metodologija izrade naučnog teksta, CID; Podgorica,2004. 8. S. Kukić: Metodologija znanstveno istraživačkog rada, Ekonomski Fakultet, Mostar 2005.

Opis silabusa na studijskom programu Poštansko-logističke tehnologije na engleskom jeziku

U nastavku su navedeni silabusi predmeta na Engleskom jeziku.

Course code: 02CPTOS020101PL	**Course title: MANAGEMENT IN TRAFFIC AND COMMUNİCATIONS**		
Level: II	**Year: I**	**Semester: I**	**Number of ECTS credits: 6**
Status: Mandatory Course		**Total number of contact hours: 90** Optional breakdown of hours by type: Lectures: 45 Tutorials: 45 Seminars Fieldwork: Laboratory Tutorials: Practice Concert activies …	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course**		
Prerequisite for enrollment:	None		
Course goal (goals):	The goal of the course is to familiarize students with the functioning of transport systems in market conditions and international standards to ensure effective and efficient operations. The course aims to equip students with knowledge about standards and standardization, as well as the interconnections between various parts of production and economic processes affected by technical standardization.		
Topics covered (Units of study): *(if necessary, the weekly implementation plan is*	1. Basics of Management: Concept, management process, and interdependence with the organization. The concept of management and the management process. Characteristics of a modern manager. Managerial functions. 2. General and Specific Characteristics of Management in the Transport System: Issues of organization and management in the		

established taking into account the specificities of organizational units)	transport system. Definitions and content of management. Management and entrepreneurship in transport and telecommunications companies. 3. General and Specific Characteristics of Management in the Transport System: Managerial tasks in administrations, institutes, and agencies. Development of logistics management. Relationships between transport policy and management. Development of the transport system and spatial-economic structuring. 4. Managerial Concepts for Improving and/or Innovating Business Processes: Process-oriented management. Innovation and/or reengineering of business processes. 5. Planning as a Function and Activity of Management: Planning in a transport company. Policies and strategies of a transport company. Process approach to strategic planning. 6. Planning as a Function and Activity of Management; Strategic analysis of competitive structure in the transport sector. Scenario methods for selecting effective business strategies. 7. Organizational Structure and Processes: Concept and broader understanding of organization. Organizational structure. 8. Organizational Structure and Processes: Organizing relationships within the organization. 9. Organizational Structure and Processes: Process-based and knowledge-based organization. Examples of organizational structures in some transport and telecommunications companies. 10. Business Management and Motivation: Business management and leadership. 11. Business Management and Motivation: Influences on human behavior and motivation. 12. Human Resource Management: Human resource management as a function of management. 13. Human Resource Management: Activities in the human resource management process. Personal development of managers. 14. Managerial Control and Quality Management: Basics of modern standardization. Methods of adopting and labeling standards, levels of conformity, and terminology related to standard adoption. Quality infrastructure. 15. Managerial Control and Quality Management: Management system standards (MSS). Integrated management systems (IMS).
Learning outcomes:	**Knowledge**: Acquired knowledge will be used to recognize key technological processes and management models specific to transport systems. **Skills**: Ability to apply theoretical and practical knowledge in transport management. **Competencies**: A systematic approach to understanding standardization, mastering modern business terminology, and practical examples from the field of transport and communications will assist

	students in their integration into technical and other activities upon graduation and employment.
Sustainable Development Goal (SDG):	• SDG4 – Quality Education • SDG8 – Decent Work and Economic Growth • SDG9 – Industry, Innovation, and Infrastructure • SDG11 – Sustainable Cities and Communities • SDG 12 - Responsible Consumption and Production • SDG 16 - Peace, Justice, and Strong Institutions
Teaching methods:	Oral presentation, discussion, demonstration, group work.
Assessment methods with grading structure:	Assessment includes creativity in lectures and exercises through independent work, partial tests during the course, and the final exam. The criteria for monitoring and evaluating student performance are as follows: • Homework/Seminar/Practical Work: 15 points (%), passed if at least 55% is achieved. • First Partial Exam/Test/Knowledge Check: 35 points (%), passed if at least 55% is achieved. • Final Exam (Second Partial): 50 points (%), passed if at least 55% is achieved. • Final Exam (Comprehensive): 85 points (%), passed if at least 55% is achieved. The final exam is organized as written/oral. The student may take the material that was not covered and/or successfully completed during the semester. The required condition for a successful exam is achieving at least 55% of the total points on the partial and final exam parts. A sufficient condition is that the sum of points earned (through homework, attendance, partial, and final exams) is 55. Homework is organized through writing assignments and projects, with no option for resubmission. For students who did not successfully complete the partial exam, the final exam consists of the entire material covered during the course. The make-up exam is organized similarly to the final exam. Student performance after all forms of assessment is graded as follows: a) 10 (A) – Outstanding success with no or minor errors, 95-100 points; b) 9 (B) – Above average, with some errors, 85-94 points;

	c) 8 (C) – Average, with noticeable errors, 75-84 points; d) 7 (D) – Generally good, but with significant deficiencies, 65-74 points; e) 6 (E) – Meets minimal conditions, 55-64 points; f) 5 (F, FX) – Does not meet minimal conditions, less than 55 points. The overall evaluation of all student obligations during the semester, or the exam grade, is based on the total number of points (%) earned through fulfilling pre-exam obligations and taking partial and final exams, with a maximum of 100 points, determined by the following scale: **Student Obligations** • Attendance in lectures and exercises: - • Homework/Seminar/Practical Work: 15 points (%) • First Partial Exam/Test/Knowledge Check: 35 points (%) • Final Exam (Second Partial): 50 points (%) • Final Exam (Comprehensive): 85 points (%)
Literature:	**Mandatory**: 1. Vujadin B. Vešović, „MENADŽMENT U SAOBRAĆAJU“, Univerzitet u Beogradu, Saobraćajni fakultet, 1997. 2. Šefkija Čekić, Ivan Bošnjak, „MENADŽMENT U TRANSPORTU I KOMUNIKACIJAMA“, Fakultet za saobraćaj i komunikacije UNSA, Fakultet prometnih znanosti UNIZG, Sarajevo, Zagreb, 2000. **Supplementary**: 1. Alija Behmen, Sabira Salihović: MATERIJALI I ROBE U TRANSPORTU - Knjiga I, klasifikacija, standardizacija, identifikacija, Fakultet za saobraćaj i komunikacije Sarajevo i DES-Sarajevo, Sarajevo, 2007. 2. Alija Behmen, Sabira Salihović: MATERIJALI I ROBE U TRANSPORTU - Knjiga II, kvalitet: osnove, principi, kontrola, Fakultet za saobraćaj i komunikacije Sarajevo i DES-Sarajevo, Sarajevo, 2008. 3. International/Regional/National Standards

Course code: 03CPTOS020101PL	**Course title: GEOGRAPHIC INFORMATION SYSTEMS**		
Level: II	**Year: I**	**Semester: I**	**Number of ECTS credits:** 6
Status: Mandatory		**Total number of contact hours: 90** Lectures: 45; Practical Exercises: 30; Seminars and Project Tasks: 15	
Course participants:	Academic staff and associates selected in the field to which the course belongs/course		
Prerequisite for enrollment:	No		
Course goal (goals):	**Familiarizing students with the fundamental concepts of GIS systems, their operational methods, planning, implementation, and potential applications.**		
Topics covered (Units of study):	☐ The concept of Geographic Information Systems (GIS) ☐ Components of GIS ☐ The process of collecting and manipulating GIS data ☐ Structure and models of spatial data ☐ Database management ☐ Coordinate systems, projections, georeferencing ☐ Geographic data bases ☐ Standardization in GIS ☐ Output data and cartography ☐ Techniques for graphical representation ☐ Principles of layered representation of spatial data ☐ Areas of application and basic GIS functions ☐ Web and mobile GIS ☐ Application of GIS in telecommunications infrastructure planning ☐ Application of GIS in transportation infrastructure planning		
Learning outcomes:	**Knowledge:** Students will become familiar with the fundamental concepts of GIS development and standardization, the principles of web and mobile GIS systems, and their specific applications with a particular		

	focus on transportation and communications. They will learn about the process of developing GIS systems, from the initial idea and need for GIS, through data collection and formation of GIS databases, to georeferencing, graphical representation, and the use of GIS systems. **Skills:** Students will acquire proficiency in specific software tools needed for designing and developing GIS systems. **Competencies:** After passing the exam, students will be capable of planning, designing, and developing GIS systems, and selecting appropriate technologies for developing specific solutions.
Sustainable Development Goal (SDG):	**SDG 9 – Industry, Innovation, and Infrastructure** **SDG 11 – Sustainable Cities and Communities**
Teaching methods:	The course is delivered through lectures, practical exercises, and hands-on laboratory work. Lectures are conducted through oral presentations with slides and practical examples. Exercises and laboratory work involve the use of software tools to address specific problems and practical tasks. Students will be required to prepare and present seminar papers and/or project tasks. Various methods are employed during the course, including oral presentations, discussions, demonstrations, individual and group work, etc.
Assessment methods with grading structure:	**Grading and Evaluation:** The total number of points a student can earn during the course is 50, with another 50 points available in the final exam. The points for the course are distributed among assignments and activities and/or seminar papers and/or project tasks, and the partial exam. The final/re-sit exam covers material not included in the partial exam, meaning it includes the second part of the material worth 50 points for students who have passed the partial exam. Students who have not passed the material covered in the partial exam will take the material from both the partial and final exams. The final/re-sit exam will be organized as a written and/or oral exam, including a practical component. The overall evaluation of all student obligations during the semester, including the exam grade, is based on the total number of points earned from fulfilling pre-exam obligations, the partial exam, and the final exam. Based on the quality of acquired knowledge and skills, a student can earn a maximum of 100

	points, according to the following scale: **Grading Structure:** • Seminar / Class Participation / Project Task: 20 points (20%) • First Test / First Knowledge Check (Partial Exam): 30 points (30%) • Final or Re-sit Exam (Second Partial Exam): 50 points (50%) **Passing Criteria:** To pass, a student must earn at least 55 points in total and achieve at least 55% of the points on the knowledge checks (partial exam and final/re-sit exam). **Final Grade System:** After all forms of knowledge assessment, the student's performance is evaluated and graded as follows: a) 10 - Excellent performance with no errors or minimal errors (95-100 points) b) 9 - Above average, with a few errors (85-94 points) c) 8 - Average, with noticeable errors (75-84 points) d) 7 - Generally good, but with significant deficiencies (65-74 points) e) 6 - Meets minimum requirements (55-64 points) f) 5 - Does not meet minimum requirements (less than 55 points)
Literature:	Mandatory: – Alem Čolaković, "Geographic Information Systems (LECTURE NOTES)," Faculty of Traffic and Communications, Sarajevo, 2023. Supplementary: – Kang Tsung Chang, „*Introduction to Geographic Information Systems*“, McGraw-Hill Education, 2019. – Paul Bolstad, „*GIS Fundamentals A First Text on Geographic Information Systems,*“ Eider Press, 2016. – Ian Heywood, Sarah Cornelius, „*An introduction to geographical information systems*“, Pearson Education Limited, 2006. – Kurt Menke, Richard Smith Jr., Luigi Pirelli, John Van Hoesen, „*Mastering QGIS*“,“ Packt Publishing Ltd., 2016. – Gábor Farkas, „Practical GIS,“ Packt Publishing Ltd., 2017. – Anita Graser, „*Learning QGIS*,“ Packt Publishing Ltd., 2016.

	– Ralph M. Stair, George W. Reynolds, „*Fundamentals of Information Systems*," Cengage Learning, 2016. – Alan Dennis, Barbara Haley Wixom, Roberta M. Roth, „*Systems analysis and design*," Wiley, 2015. – Patricia Wallace, „*Introduction to Information Systems*," Pearson Education, 2015. – Arthur M. Langer, „*Analysis and Design of Information Systems, Springer-Verlag*," 2008. – John Wang, „*Innovations in Supply Chain Management for Information Systems*," Business Science Reference, 2010. – Christos Kalloniatis: "*Modern Information Systems*," InTech Croatia, 2012.

Course code: 04CPTOS020101PL	**Course title: LOGISTICS OF RETURN FLOWS**		
Level: II	**Year: I**	**Semester: I**	**Number of ECTS credits:** 6
Status: Mandatory Course		**Total number of contact hours: 90** Lectures: 45 hours Exercises: 30 hours Seminars and Project Tasks: 15 hours	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course** [Do not enter names in this section. Use the formulation as indicated in this section]		
Prerequisite for enrollment:	No		
Course goal (goals):	The course aims to introduce students to the fundamental concepts of reverse logistics. The reuse of products, product parts, or materials provides benefits from both ecological and socio-economic perspectives. The objective of the course is to familiarize students with the field of reverse logistics from the perspective of various logistical processes.		
Topics covered (Units of study):	1. Reverse Logistics - Definition and Scope. 2. Reasons for Returns in Reverse Logistics. 3. Reverse Logistics Processes. 4. Participants in Reverse Logistics.		

(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)	5. Waste Management - Classification, Legal Regulations, Waste Collection, Waste Treatment. 6. Logistical Aspects of Waste Management. 7. Electronic and Electrical Waste – EU Directives, Requirements for the Logistics System. 8. PET Materials and Packaging – Collection Concepts, Recycling Opportunities, Sorting, and Testing. 9. Structure of Reverse Logistics Networks – Scope, Characteristics, Classification. 10. Networks of Reverse Logistics Units. 11. Systems of Reverse Logistics Units. 12. Models for Structuring Reverse Logistics Systems.
Learning outcomes:	Knowledge: Students will become familiar with the reverse logistics system and its role and significance. Skills: Students will master certain tools necessary for designing and developing reverse logistics systems. Competencies: After passing the exam, students will be able to plan, design, and manage a reverse logistics system.
Sustainable Development Goal (SDG):	SDG 4 – "Ensure inclusive and quality education and promote lifelong learning opportunities for all." SDG 5 – "Achieve gender equality and empower all women and girls." SDG 8 – "Promote inclusive and sustainable economic growth, full and productive employment, and decent work for all." SDG 9 – "Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation." SDG 11 – "Make cities and human settlements inclusive, safe, resilient, and sustainable;" SDG12 - "Ensure sustainable consumption and production patterns".
Teaching methods:	Theoretical instruction is presented using modern multimedia tools, with an emphasis on interactive teaching methods. Exercises and laboratory work are conducted using contemporary software tools in the university's computer labs, focusing on solving specific problem-based and practical tasks.
Assessment methods with grading structure:	The evaluation and grading of student performance during the course are conducted as follows: • Homework/Seminar Paper/Project Task: 0 to 15 points (15%) • Partial Exam/Test/Knowledge Check: 0 to 35 points (35%)

	• Total Points: The maximum number of points a student can achieve during the course is 50 points (50%). • Final Exam: 0 to 50 points (50%). To pass the course, the student must individually pass each of the three components (seminar, partial exam, and final exam) and achieve a total of at least 55 points (55%). Grading Scale: The final success of the student, based on all forms of knowledge assessment, is evaluated and graded according to the following scale: • 10 (A) - Excellent, with no errors or minor errors, 95-100 points • 9 (B) - Above average, with some errors, 85-94.9 points • 8 (C) - Average, with noticeable errors, 75-84.9 points • 7 (D) - Generally good, but with significant deficiencies, 65-74.9 points • 6 (E) - Meets minimum requirements, 55-64.9 points • 5 (F, FX) - Does not meet minimum requirements, 0-54.9 points Student Obligations and Points Distribution: • Homework/Seminar Paper/Project Task: 15 points (15%) • Partial Exam/Test/Knowledge Check: 35 points (35%) • Final Exam (Partial + Theory): 50 points (50%)
Literature:	Mandatory: 1. R.Dekker, M. Fleishmann, K. Inderfurth, Luk N. Van Wassenhove, Revese Logistics – Quantitative Models for Closed-Loop Supply Chains, Springer-Verlag Berlin Heidelberg, 2004. 2. Donald F. Blumberg, Introduction to Management of Reverse Logistics and Closed Loop Supply Chain Processes, CRC Press, Boca Raton, 2005. 3. Juan Pablo Zoto Zuluaga, Reverse logistics – Models and applications, Universitat Pompeu Fabra, 2005. 4. Dowlatshahi, Shad. "Developing a theory of reverse logistics." Interfaces 30.3 (2000): 143-155. 5. DEKKER, Rommert, et al. (ed.). Reverse logistics: quantitative models for closed-loop supply chains. Springer Science & Business Media, 2013. 6. DYCKHOFF, Harald; LACKES, Richard; REESE, Joachim (ed.). Supply chain management and reverse logistics. Springer Science & Business Media, 2013. 7. ROGERS, Dale S.; TIBBEN-LEMBKE, Ronald. An examination of reverse logistics practices. Journal of business logistics, 2001, 22.2: 129-148.

Course code:	**Course title: SECURITY AND PROTECTION IN POSTAL AND**

05CPTOS020101PL	LOGISTICS SYSTEMS		
Level: II	**Year: I**	**Semester: I**	**Number of ECTS credits:** 6
Status: Mandatory course		**Total number of hours: 90** Lectures: 45 Exercises: 30 Laboratory Exercises: 15	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course** [Do not enter names in this section. Use the formulation as indicated in this section]		
Prerequisite for enrollment:	No		
Course goal (goals):	Mastering professional knowledge to ensure the safest, most rational, and efficient delivery of postal shipments while maintaining the quality and quantity of postal items. Acquiring competencies for effectively assessing whether a shipment meets security requirements, organizing measures for inspecting shipments, and proposing methods for protecting shipments at various stages of transit. Successfully applying methodologies and techniques to reduce the risk and threat of undesirable consequences (such as robbery) for postal shipments, as well as measures to combat postal crime. Understanding the systemic approach to establishing security and protection aimed at safeguarding personnel and their activities from intentional or accidental unauthorized actions intended to harm individuals, organizations, or their reputations.		
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Introduction to the Course "Security and Protection in Postal-Logistics Systems" 2. Development, Goals, Subject, and Methods of Security Studies as an Academic Discipline (development, goals, and methods). Tasks and significance of security and protection in postal traffic. 3. Subject of Study for Security in Postal and Logistics Traffic 4. Definition, Basic Principles for Organizing, Arranging, and Implementing Protection 5. General Principles of Protection and Security. Protection – Surveillance and Management of Protection Systems, Verification of System Validity		

	6. Types and Sources of Threats in Postal and Logistics Systems. Concept of Protecting Facilities and Stages of the Technological Process. Planning Technical Protection 7. Security in Service Delivery and Transport 8. Protection of Units with a Complex System. Integrated Technical Protection System 9. Protection as an Important Indicator of Service Quality. Indicators and Measures of Service Quality (Internal and External Control) 10. Certificates in the Field of Security and Protection 11. Organization and Content of Control. Control and Quality Management 12. Efficiency and Rationalization in the Technological Process (technological process, efficiency, and rationalization in the technological process, indicators of efficiency and rationalization in the technological process) 13. Technological Achievements in Security. Intelligent Transportation Systems in Package Tracking and Fleet Management 14. Legal Regulations Governing Security in Transportation and Postal Traffic Worldwide. Legal Framework in Bosnia and Herzegovina Regarding the Protection of Postal and Logistics Systems. Laws and Legal Acts Related to Security in Bosnia and Herzegovina
Learning outcomes:	Knowledge: Theoretical and practical knowledge in the field of security and protection in postal and logistics traffic. The subject of study should ensure a level of competencies and knowledge necessary for solving everyday problems in the field of security and protection. Skills: Ability to apply theoretical and practical knowledge in the field of security and protection in postal and logistics traffic. Competencies: Abilities to independently understand and use knowledge required to solve specific problems in the field of security and protection.
Sustainable Development Goal (SDG):	SDG9 – "Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation"; SDG11 – "Make cities and human settlements inclusive, safe, resilient, and sustainable"; SDG16 – "Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels".
Teaching methods:	The theoretical part of the course, prepared from reference literature, is

	presented using modern multimedia tools, with an emphasis on encouraging interactivity in teaching. Exercises and laboratory sessions are conducted using contemporary software tools in the faculty's computer labs, and involve solving specific problem-based and practical tasks. During laboratory sessions/fieldwork/practice, skills necessary for both individual and team work will be developed to accomplish tasks within the given area.
Assessment methods with grading structure:	Assessment of Creativity: Evaluation is based on creativity during classes and exercises through the preparation of independent work, as well as the assessment of partial tests during the course and the final exam. The criteria for monitoring and evaluating students' work during the course are as follows: - Homework/Seminar/Practical Work: 15 points (%), passed if more than 50% is achieved. - First Partial Exam/Test/Knowledge Check: 35 points (%), passed if more than 50% is achieved. - Final Exam (Second Partial): 50 points (%), passed if more than 50% is achieved. - Final Exam (Integral): 85 points (%), passed if more than 50% is achieved. The total number of points (%) that a student can achieve based on the mentioned monitoring during the course amounts to a maximum of 50 points (%), which together with the Final Exam (Second Partial) makes up 100 points (%). For students who did not pass the First Partial Exam, the Final Exam (Integral) is organized from the entire covered material during the course and exercises, and is valued at 85 points (%), which together with the seminar/practical work makes 100 points (%). Final Evaluation: After all forms of knowledge checks, the student's success is evaluated and graded according to the following scale: - 10 (A) - Outstanding success with no or minimal errors, 95-100 points. - 9 (B) - Above average with some errors, 85-94 points. - 8 (C) - Average with noticeable errors, 75-84 points. - 7 (D) - Generally good but with significant shortcomings, 65-74 points. - 6 (E) - Meets minimal conditions, 55-64 points. - 5 (F, FX) - Does not meet minimal conditions, less than 55 points. The overall assessment of all student obligations during the semester,

	and the grade on the exam, is based on the total number of points (%) the student has earned by fulfilling pre-exam obligations and passing partial and final exams, based on the quality of acquired knowledge and skills, and includes a maximum of 100 points, determined according to the following scale: Student Obligations — Points (%) Attendance at lectures and exercises — - Homework/Seminar/Practical Work — 15 points (%) First Partial Exam/Test/Knowledge Check — 35 points (%) Final Exam (Second Partial) — 50 points (%) Final Exam (Integral) — 85 points (%)
Literature:	Mandatory: 1. Deljanin, A.: „Sigurnost i zaštita u poštanskom prometu“, Fakultet za saobraćaj i komunikacije, Sarajevo, 2011. 2. Arnautović, E.: „Tehnologija i tehnika poštanskih komunikacija“, Fakultet za saobraćaj i komunikacije, Univerzitet u Sarajevu, Sarajevo, 2003. 3. Arnautović, E.: „Tehnologija poštanskog saobraćaja“, Fakultet za saobraćaj i komunikacije, Sarajevo, 1998. 4. Bača, M.: „Uvod u računalnu sigurnost“, Narodne novine, 2004. 5. Bašić, N., Stoett, P.: „Sigurnosne studije u tranziciji“, prvo izdanje, Univerzitet u Bihaću, 2003. 6. Baručija, H.: „Priručnik za rad službe obezbjeđenja“, Sing Protekt, Sarajevo, 2001. 7. Beridan, I.: „Politika i sigurnost“, Fakultet političkih nauka, Sarajevo 2009. 8. Bošnjak, I.: „Kontrola poštanskog prometa“, Fakultet prometnih znanosti, Zagreb, 2004. 9. Bošnjak, I.: „Tehnologija poštanskog prometa I i II“, Fakultet prometnih znanosti, Zagreb, 1999. 10. Bošnjak, I.: „Inteligentni transportni sustavi I“, Sveučilište u Zagrebu, Fakultet prometnih zananosti, u Zagrebu, 2006.

	11. Bukumirović, M.: „Automatizacija procesa rada u poštanskim sistemima“, Saobraćajni fakultet, Beograd, 1999. 12. Buzan, B., People States and Fear i The National Security Problem in International Relations, London, 1983. 13. Cerovac, V.: „Tehnika i sigurnost prometa“, Fakultet prometnih znanosti, Zagreb, 1997. Supplementary: 1. Delišimunović, D.: „Menadžment zaštite i sigurnosti“, I.T.Graf d.o.o, Zagreb, 2006. 2. Delišimunović, D.: „Suvremeni koncepti i uređaji zaštite“, I.T.Graf d.o.o, Zagreb, 2002. 3. Deljanin, A., Kiso, F.: „Saobraćajno komunikacijski sistemi“, Univerzitetski udžbenik, Univerzitet u Sarajevu, Fakultet za saobraćaj i komunikacije, Sarajevo 2016. godine 4. Golubić, J.: „Osnove tehnike i sigurnosti prometa“, Sveučilište u Zagrebu, Fakultet prometnih znanosti, Zagreb, 1992. 5. Grizold, A.: „Međunarodna sigurnost i etnički konflikt“, Politička misao, Zagreb, 1998. 6. Grizold, A.: „Međunarodna sigurnost“, FPZ, 1988. 7. Grupa autora, Stručni leksikon osnovnih vojnih i ratnih političko pravnih pojmova, Ministarstvo odbrane BiH, Sarajevo, 1996. 8. Gulan, N.: „Organizacija i eksplatacija poštanskog saobraćaja“, knjiga 1 i 2, ZJPTT, Beograd, 1982. 9. Hajrudin, E.: „Sigurnost prijenosa podataka“, Međunarodno savjetovanje o telekomunikacijama, Zbornik radova, Elektrotehnički fakultet, Sarajevo, 2000. 10. Hodžić, M.: „Zbirka propisa iz oblasti zaštite ljudi i imovine u FBiH“, Udruženje menadžera sigurnosti u BiH, Sarajevo, 2005. 11. Huseinbašić, Č.: „Upravljanje sistemom zaštite i spašavanja“, Jordan studio d.o.o. Sarajevo, 2009. 12. Ivanković, Č.: „Modeli definisanja kapaciteta i kontejnerskih terminala“, HAZU, ZAGREB, 1991. 13. Jasmin, A.: „Sistemi privatne sigurnosti“, Fakultet za kriminalistiku,

	kriminologiju i sigurnosne studije studije, Sarajevo, 2009. 14. Kržalić, A.: „Privatna sigurnost“, Centar za sigurnosne studije-BiH, Sarajevo, 2007. 15. Kardum, Z.: „Upravljanje rizikom u prijevozu vrijednosne pošiljke“, Topical, Zagreb, 2004. 16. Masleša, R., Bisić, M.: „Osnovi sigurnosti“ - skripta, Sarajevo, 2007. 17. Masleša, R.: „Političko - sigurnosni aspekt terorizma sa osvrtom na situaciju u BiH“, Specijalno izdanje Časopisa "Kriminalističke teme", pod naslovom Terorizam, Decembar, 1999. 18. Masleša, R.: „Savremeni sigurnosni izazovi i kriminalistička profesija“, Međunarodni naučni simpozij: „Mjesto i perspektive kriminalističkih nauka i kriminalističke profesije u savremenim uslovima, Sarajevo, 19-20,03, 2001. 19. Miodrag, Ž.: „Digitalni potpis“, Filozofski fakultet Sveučilišta u Zagrebu, Zagreb, 2005. 20. Mitar, M.: „Osnovna pitanja u vezi s pojmom sigurnosti“, Policija i sigurnost, Zagreb, 1994. 21. Miroslav B.: „Uvod u računalnu sigurnost“, Narodne Novine Zagreb, Svibanj, 2004. 22. Milovan G.: „Poštanski saobraćaj 1“, Beograd, Zavod za izdavanje udžbenika, 2003. 23. Milovan G.: Poštanski saobraćaj 2“, Beograd, Zavod za izdavanje udžbenika, 2003. 24. Potemkin, Grizold A.: „Međunarodna sigurnost“, Zagreb, 1998. 25. Pravilnik o zaštiti ljudi i imovine u JP BH Pošta, Sarajevo 26. Priručnik sigurnosti pošte i operacija na aerodromima 27. Pravilnik o općim uvjetima za pružanje poštanskih usluga FBiH („Službene novine FBiH“ 4/07) 28. Posebni uslovi za vršenje poštanskih usluga (Sl.glasnik RS br.130/11) 29. Simić, I., Ružica.: „Fizičko-tehnička zaštita objekata“, Beograd, 1995.

	30. Stajić, Lj.: „Osnovi bezbednosti“, Policijska akademija Beograd, Beograd, 2004. 31. Univerzalni akti svjetskog poštanskog saveza 32. Svjetska poštanska konvencija 33. Zbirka propisa iz oblasti Zaštite ljudi i imovine u FBiH, Udruženje menadžera sigurnosti u BiH, Sarajevo, 2005. 34. Zakon o poštama Bosne i Hercegovine ("Sl. glasnik BiH" br. 33/05)

Course code: 02CPTOS020101PL	**Course title: SIMULATIONS OF POSTAL AND LOGISTICS SYSTEMS AND OPERATIONS**		
Level: II	**Year: I**	**Semester: I**	**Number of ECTS credits: 6**
Status: Elective Course		**Total number of contact hours: 90** Optional breakdown of hours by type: Lectures: 30 Tutorials: 30 Seminars Fieldwork: Laboratory Tutorials: 30 Practice Concert activies …	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course** [Do not enter names in this section. Use the formulation as indicated in this section]		
Prerequisite for enrollment:	None		
Course goal (goals):	Develop basic knowledge and skills in the field of modeling and simulation of static and dynamic systems, simulation tools, and familiarize with the functionalities of applications in managing logistic systems and operations. Along with practical experience in the analytical		

	and modeling aspects of simulation application, it provides tools for analyzing input distributions and processes, methods for generating random numbers and processes, statistical analysis of results, experimental design, and optimization of simulation models.
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. The concept of simulation. Reasons, advantages, and disadvantages of the simulation process. 2. Classification, types, and selection of simulation models. 3. Analytical vs simulation modeling of systems. 4. Conceptual modeling of postal-logistic systems. 5. Functional design of postal-logistic systems. 6. Process design (technical, organizational, and information system). 7. Simulation for supporting the design of postal-logistic systems. 8. Modeling of queuing systems in postal-logistic systems. 9. Flow and development of the simulation process. 10. Implementation of models. 11. Validation and verification of the simulation model. 12. Analysis of simulation results. 13. Simulation of production operations in postal-logistic systems. 14. Simulation of supply chain management in postal-logistic systems. 15. Simulation of production management including automation processes in postal-logistic systems.
Learning outcomes:	**Knowledge**: Theoretical and practical knowledge in the field of statistics and probability theory used for modeling postal-logistic systems. **Skills**: Ability to apply theoretical and practical knowledge for analyzing inputs and results using event-driven simulation principles, and capability to plan production, transportation, and distribution, select suppliers, configure supply chains, route vehicles, etc. **Competencies**: Ability to independently understand and use knowledge to optimize logistic and production systems using specific simulation tools, and to analyze and critically evaluate various production and logistic solutions.
Sustainable Development Goal (SDG):	• SDG4 – Quality Education • SDG 8 - Decent Work and Economic Growth • SDG9 – Industry, Innovation, and Infrastructure • SDG 11 - Sustainable Cities and Communities • **SDG 12 -** Responsible Consumption and Production • SDG17 – Partnerships for the Goals
Teaching methods:	Teaching is conducted through lectures, exercises, laboratory exercises/fieldwork/practice. The following methods are used: oral presentation, discussion method, demonstration method, graphical work

	method, drawing method, and group work method. Theoretical concepts and principles are covered in lectures with descriptive examples and solving specific tasks. Additional examples are considered and solved through exercises, laboratory exercises/fieldwork/practice, enabling continuous work and preparation for independent problem-solving. In laboratory exercises/fieldwork/practice, skills necessary for individual and team work will be developed to accomplish tasks in the given field.
Assessment methods with grading structure:	Assessment of creativity in teaching and exercises through homework/independent work/practical work, assessment of partial exams during teaching, as well as assessment of the final/remedial exam. The criteria for monitoring the work and evaluation of the student are carried out as follows: • Homework: 0 to 15 points (%); • First Partial Exam: 0 to 35 points (%); • Final Exam: Second Partial (0 to 50 points (%)) and/or remedial First Partial (0 to 35 points (%)); The final exam is organized as written and/or oral. The student may take the exam material that was not covered and/or successfully completed during the semester. The required condition for successfully passing the exam is achieving at least 55% of the maximum number of points in the first partial and the final (second partial) part of the exam, and the sufficient condition is that the sum of achieved points (homework/practical work + first partial + second partial) is 55. Homework is realized through homework assignments and quizzes or practical work. Points achieved on quizzes and submitted homework cannot be improved. For students who did not successfully complete the first partial exam, the final exam consists of the entire covered material during the teaching period. The remedial exam is organized in the same way as the final exam. The final success of the student after all the provided forms of knowledge assessment is evaluated and graded using the following grading system:

	a) 10 (A) - outstanding performance with no or minor errors carries 95-100 points; b) 9 (B) - above average with some errors carries 85-94 points; c) 8 (C) - average with noticeable errors carries 75-84 points; d) 7 (D) - generally good but with significant shortcomings carries 65-74 points; e) 6 (E) - meets minimum criteria carries 55-64 points; f) 5 (F FX) - does not meet minimum criteria less than 55 points.
Literature:	**Mandatory**: 3. Lecture notes and slides 4. Jean-Michel Réveillac: Modeling and Simulation of Logistics Flows 1: Theory and Fundamentals, Wiley, 2017. 5. Merkuryev., Merkuryeva G., Piera M.A., Guasch A.: Simulation-based Case Studies in Logistics: Education and Applied Research, Springer-Verlag London, 2009. 6. K. Ganesh, S.C. Lenny Koh, A. Saxena, R. Rajesh: Logistics Design and Modelling - A Simulation Perspective, 2011. 7. Simchi-Levi, D., Kaminsky, P.: Designing and Managing the Supply Chain, 2nd edn, Boston: McGraw-Hill, 2003. 8. Harrell, C., Ghosh, B.K., Bowden, R.: Simulation Using ProModel, Boston: McGraw-Hill, 2000. 9. Pidd, M.: Computer Modelling for Discrete Simulation, Chichester, New York: Wiley, 1989. 10. Applying simulation in lean service to enhance the operational system in Indian postal service industry 11. Silvia Ďutková et al.: Simulation of Queuing System of Post Office, Transportation Research Procedia 40 (2019) 1037–1044 12. Hans P.M. Veeke: Simulation Integrated Design for Logistics, PhD thesis, Netherlands, 2003. **Supplementary**: 1. Law, M.A.: Simulation Modeling & Analysis, McGraw-Hill, 2007. 2. Sokolowski J.A., Banks C.M.: Principles of Modeling and Simulation: A Multidisciplinary Approach, John Wiley and Sons, Ltd., 2009.

Course code: 06CPTOS020102PL	**Course title: : BUSINESS MODELS OF COURIER SERVICES**		
Level: II	**Year: I**	**Semester: II**	**Number of ECTS credits: 6**
Status: Mandatory course		**Lectures: 45** **Exercises: 30** **Laboratory exercises: 15**	

Course participants:	**Academic staff and associates selected in the field to which the course belongs/course [Do not enter names in this section. Use the formulation as indicated in this section]**
Prerequisite for enrollment:	No
Course goal (goals):	The course "Courier Services Technology" aims to provide a level of knowledge about all the principles of courier services in the postal market.
Topics covered (Units of study):	1. Concept and definition of courier services 2. Historical overview of courier services 3. Business models of courier services 4. Technology and organization of courier services 5. Delivery and distribution technology 6. Technology and IT support for pickup at the sender's address 7. Processes in the central office of the distribution area 8. Selection of the most suitable vehicle and transportation optimization 9. Vehicle communication and navigation 10. Online shipment tracking 11. Service quality analysis of courier services 12. Remote monitoring of vehicles, drivers, and cargo (shipments) 13. Eco-friendly vehicle orientation concept 14. Concept of building a city logistics terminal 15. Concept of logistics cooperation among courier services 16. Logistic centers and terminals for courier services
Learning outcomes:	Knowledge: Students who complete this course will acquire basic and additional knowledge about courier services. Skills: Collaboration in learning through pair or group work, presentation skills, research skills on assigned topics. Competencies: Adequate basic and additional knowledge about courier services. The course "Courier Services Technology" aims to provide a level of knowledge about all the principles of courier services in the postal market.
Teaching methods:	Oral presentation method, discussion method, demonstration method, group work method.
Assessment methods with grading structure:	Assessment of creativity in lectures and exercises through independent work, evaluation of partial tests during the course, and the final exam grade. The criteria for monitoring student progress and evaluation during the course are based on the following system:

	- Homework/seminar paper/practical work: 15 points (%), passed if at least 55% is achieved. - First partial exam/test/knowledge check: 35 points (%), passed if at least 55% is achieved. - Final exam (Second partial exam): 50 points (%), passed if at least 55% is achieved. - Final exam (Comprehensive): 85 points (%), passed if at least 55% is achieved. The final exam is organized as a written/oral exam. The student may retake material they did not pass or successfully complete during the semester. The necessary condition for passing the exam is to achieve at least 55% of the total points on both the partial and final exam. Additionally, the sum of points earned (through homework, attendance, partial, and final exams) must be at least 55. Homework is organized through written assignments and projects, and there is no opportunity for revision. For students who did not pass the partial exam, the final exam will cover the entire material of the course. The retake exam is organized in the same way as the final exam. The student's overall success, after all forms of knowledge assessment, is evaluated according to the following grading system: a) 10 (A) – outstanding performance with no or minimal errors, 95-100 points; b) 9 (B) – above average with some errors, 85-94 points; c) 8 (C) – average with noticeable errors, 75-84 points; d) 7 (D) – generally good, but with significant shortcomings, 65-74 points; e) 6 (E) – meets the minimum requirements, 55-64 points; f) 5 (F, FX) – does not meet minimum requirements, less than 55 points. The total assessment of all student obligations during the semester, i.e., the exam grade, is based on the total number of points (%) the student earned by fulfilling pre-exam obligations and passing the partial and final exams. The total score is a maximum of 100 points, evaluated according to the following scale:

	Student obligations **Points (%)** Attendance at lectures and exercises - Homework/Seminar/Practical work 15 points (%) First Partial exam/Test/Knowledge check 35 points (%) Final exam (Second Partial) 50 points (%) Final exam (Comprehensive) 85 points (%)
Literature:	Mandatory: Deljanin, A., Sigurnost i zaštita u poštanskom prometu, Fakultet za saobraćaj i komunikacije, Sarajevo, 2011. Arnautović, E., Tehnologija poštanskog saobraćaja, Fakultet za saobraćaj i komunikacije, Sarajevo, 1998. Gulan, N. "Organizacija i eksploatacija poštanskog saobraćaja 2 "Saobraćajni fakultet Beograd Bošnjak, I., Tehnologija poštanskog prometa I i II, Fakultet prometnih znanosti, Zagreb, 1999. Kujačić Momčilo" Poštanske usluge i mreža" Fakultet tehničkih nauka, Novi Sad,2010 Supplementary: Kujačić Momčilo" Nove tehnologije i usluge u poštanskom saobraćaju" Fakultet tehničkih nauka, Novi Sad,2012 Slobodan Zečević, Snežana Tadić" City logistika" Saobraćajni fakultet,Univerzitet u Beogradu, Beograd,2013 http://www.postaltechnologyinternational.com/ http://www.upu.int/en.html www.postandparcel.info

Course code: 07CPTOS020102PL	**Course title: INFORMATION TECHNOLOGIES AND FREIGHT FORWARDING**		
Level: II	**Year: I**	**Semester: II**	**Number of ECTS credits:** 6
Status: Elective		**Total number of contact hours: 90** Optionally elaborate the distribution of hours by type:	

	Lectures 45 Exercises 30 Seminar and project task: 15
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course**
Prerequisite for enrollment:	No
Course goal (goals):	Familiarization with modern information and communication technologies applied in the field of logistics and freight forwarding, specific software tools, and the methods and effects of their application.
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Introduction 2. Identification of technological processes in logistics and freight forwarding 3. Identification of key stakeholders in the logistics and freight forwarding chain 4. Theoretical foundations of current information technology solutions applied in freight forwarding 5. Importance and application of software applications in managing logistics and freight forwarding systems and implementation of best practices 6. Methodological approaches in designing information technology solutions in logistics and freight forwarding 7. CRM (Customer Relationship Management) in Freight Forwarding and Logistics Companies Planning and optimizing forwarding services - maximizing utility and reducing costs of ordering, booking, and shipping processes 8. Management of import, export, and global foreign trade exchange (harmonized tariffs, foreign trade agreements, INCOTERMS) 9. Software applications for business-to-business SCM (Supply Chain Management) 10. Software applications for managing customs procedures based on EU legislation 11. Software applications for managing warehousing operations 12. Software applications for managing the transport chain 13. Web applications and online services for foreign trade compliance, tariff classification, import-export documentation, electronic reporting, verification 14. Integrating segmented software applications into a holistic logistics- freight forwarding information system (end-to-end management)
Learning outcomes:	Knowledge: Through lectures, exercises, laboratory work, and practical activities, students should acquire the necessary knowledge and skills

	for practical application through: the development of IT and evaluation of its effects in logistics forwarding, as well as the independent formulation of research objectives and the application of appropriate methods and models for their realization. Skills: A systemic approach to designing IT business processes in logistics forwarding and understanding algorithms as the basis for forwarding software solutions; identifying and using relevant IT solutions in the field of logistics forwarding, critical analysis, evaluation, and synthesis of available knowledge; developing and applying forwarding software management models, and presenting acquired knowledge to professional and scientific audiences. Competencies: Application of acquired knowledge in specific models.
Sustainable Development Goal (SDG):	SDG 4: Quality Education - Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. SDG 8: Decent Work and Economic Growth - Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all. SDG 9: Industry, Innovation, and Infrastructure - Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation. SDG 12: Responsible Consumption and Production - Ensure sustainable consumption and production patterns. SDG 16: Peace, Justice, and Strong Institutions - Promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels.
Teaching methods:	During the course delivery, the instructor presents individual thematic units (ex cathedra), allows students to follow educational video content (DVDs, video presentations) related to the subject area, and organizes discussions on a given topic (interactive teaching). In practical classes, the discussion and resolution of examples and tasks related to theoretical topics are conducted, and assistance is provided to students in independently solving tasks, and in the preparation of programs,

	projects, and seminar papers.
Assessment methods with grading structure:	Criteria for assessing and grading students' work during the course are as follows: Seminar Paper / Project Task: 0 to 15 points, passed if over 50% is achieved First Test / First Knowledge Check / First Partial Exam: 0 to 35 points, passed if over 50% is achieved Final Exam – Written exam: 20 points Final Exam – Oral exam: 30 points Final Exam (Integral) – Written exam: 40 points Final Exam (Integral) – Oral exam: 45 points To pass the exam, the student must pass the oral part of exam. The total number of points a student can achieve during the course is a maximum of 50 points. The final exam includes the material that the student did not pass in the partial exam, which means it covers the second part of the material (second partial exam) which is valued at 50 points or consists of the entire material, i.e., both the first and second partial exams. The total evaluation of all student obligations during the semester, i.e., the exam grade, is based on the total number of points (%) that the student has earned by fulfilling pre-exam obligations, passing the partial and final exams. Based on the quality of the acquired knowledge and skills, the student can achieve a maximum of 100 points, according to the following scale: Grading Structure: Points (%) Seminar Paper / Project Task: 15 points (%) First Test / First Knowledge Check (First Partial Exam): 35 points (%) Final Exam (Second Partial Exam): 50 points (%) The necessary condition for successfully completing the exam is a result of 55 points, with a minimum of 50% required on each part of the exam (activity, partial exam, final written exam). This means that to pass the

	exam, the student must meet the following conditions: Activity (Seminar Paper / Project Task): 7,5 points First Test / First Knowledge Check / Partial Exam: 17.5 points Final Exam (Second Partial Exam) – Written Part: 10 points Students who pass the partial exam only need to take the second part of the material (the part not covered in the partial exam) during the final exam. Students who do not pass the partial exam will take the entire material during the final exam, with the criteria for passing the exam remaining identical. The final exam is organized as a written and/or oral exam. Activity can be tracked through homework, seminar papers, project tasks, or quizzes. Note: Students are required to attend at least 80% of the total class hours, and attendance is a condition for verifying proper class participation. In justified cases (illness), a student may be excused from classes, for which they must provide a medical excuse. Seminar papers and homework will be graded only if submitted by the defined deadlines. Late submissions will not be graded. Final student performance after all forms of knowledge assessment is evaluated and graded according to the following system: a) 10 - Exceptional performance with no errors or only minor errors, 95-100 points; b) 9 - Above average, with some errors, 85-94 points; c) 8 - Average, with noticeable errors, 75-84 points; d) 7 - Generally good, but with significant shortcomings, 65-74 points; e) 6 - Meets minimum requirements, 55-64 points; f) 5 - Does not meet minimum requirements, less than 55 points.
Literature:	Mandatory: 1. R. Zelenika: Logistics Forwarding, Faculty of Economics, Zagreb, 2000.

	2. Zelenika, R.: Logistics Systems, Faculty of Economics in Rijeka, 2005. 3. Gordana M. Radivojević, Information Management in Logistics. Belgrade 2023. 4. Ivanković, Č.: Forwarding and Logistics, Faculty of Transport Sciences, Zagreb, 2005. 5. R. Zelenika: International Forwarding, Faculty of Economics, Zagreb, 1996. 6. Deljanin: Logistics in Transport and Communications, Script, FSK, 2013. 7. Deljanin: Logistics Systems, Script, FSK, 2014. Supplementary: 1. Andrijanić I., Aržek Z., Prebežac D., Zelenika R.: Transport and Forwarding Business, Zagreb, 2001. 2. Z. Aržek, G. Badovinac: Transport and Insurance, Publishing and Instruction Bureau, Zagreb, 1986. 3. J. Mađarić: International Forwarding, Faculty of Transport Sciences, Zagreb, 1991. 4. Grabovac: Responsibility of Multimodal Transport Entrepreneurs, Traffic Faculty, Split, 1986. 5. Shipping and Logistics Management, Y H V Lun; Kee-hung Lai; T C E Cheng, Publisher: New York; London: Springer, 2010. 6. International Logistics Supply Chain Outsourcing: From Local to Global, Alan Rushton; Steve Walker, Publisher: London: Kogan Page, 2007. 7. Transportation Management with SAP TM, Bernd Lauterbach, Stefan Sauer, Jens Kappauf, Jens Gottlieb, Dominik Metzger, Christopher Sürie, 2nd, updated and revised edition, 2016. 8. Warehouse Management with SAP EWM, Balaji Kannapan, Hari Tripathy, Vinay Krishna, 2nd, updated and revised edition, 2016. Journals: • International Journal of Physical Distribution • Computers and Operations Research • International Journal of Information Management • European Journal of Operational Research • Journal of Business Logistics

Course code: 08CPTOS020102PL	**Course title: LOCATION AND NAVIGATION SYSTEMS**

Level: II	**Year: I**	**Semester: II**	**Number of ECTS credits:** 6
Status: Mandatory		**Total number of contact hours:** 90 **Lectures:** 45 **Tutorials:** 30 **Laboratory work:** 15	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course**		
Prerequisite for enrollment:	None		
Course goal (goals):	The goal of the course is to introduce students to the reasons for the emergence, development, application, and importance of LCS and LBS services. The course will cover user positioning techniques in communication networks and networks designed exclusively for positioning, as well as positioning techniques in both indoor and outdoor systems.		
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Origins and terminology in location and navigation systems 2. Classification of positioning methods 3. Standardization of LCS services 4. Integrated and standalone positioning methods 5. Mobile-based and network-based positioning methods 6. Radio signal propagation 7. Satellite positioning methods 8. Positioning methods in cellular radio systems 9. Indoor positioning methods (WLAN and Bluetooth) 10. Indoor positioning methods (infrastructure systems, cameras, infrared technology) 11. Algorithms for determining user location 12. User positioning in LTE networks 13. Application of location and navigation systems 14. Privacy and security aspects of user protection 15. Future of LBS services: User requirements and expectations		
Learning outcomes:	**Knowledge:** Students will acquire theoretical and technical knowledge of the realization of location and navigation services. They will learn about the technologies and mathematical methods used for user positioning in various systems. **Skills:** Students will develop the ability to assess the accuracy, cost, and feasibility of implementing positioning and navigation systems. They		

	will be capable of selecting appropriate positioning methods for specific areas through comparative analysis. **Competencies:** Students will be competent in independently selecting, analyzing, and solving problems related to user positioning in both indoor and outdoor environments. They will also be capable of applying privacy and security measures to protect user data in location-based services.
Sustainable Development Goal (SDG):	SDG9 – Industry, Innovation, and Infrastructure SDG11 – Sustainable Cities and Communities
Teaching methods:	Lectures, tutorials, laboratory work/fieldwork/practice. The following methods will be employed: oral presentations, discussions, demonstrations, graphical and software visualizations, and group work. Lectures will cover theoretical concepts, with examples and problem-solving tasks. Additional examples will be explored in tutorials using relevant software tools. Laboratory work/fieldwork will develop individual and team skills necessary to complete tasks from the given field.
Assessment methods with grading structure:	Assessment methods with grading structure: Creativity in class and exercises will be evaluated through independent work, partial exams during the course, and a final exam. The grading criteria during the course are as follows: • Homework/seminar work/practical work: 15 points (%), passed if more than 50% is achieved. • I Partial exam/test/knowledge check: 35 points (%), passed if more than 50% is achieved. • Final exam (II Partial): 50 points (%), passed if more than 50% is achieved. The total number of points (%) that a student can achieve during the course is a maximum of 50 points (%), and with the Final exam (II Partial) it totals 100 points (%). For students who do not pass the I Partial exam or the Final exam, a make-up exam is organized, where both parts must be passed with at least 50% of the points. The final success of the student, after all the forms of knowledge assessment, is graded as follows:

	a) 10 (A) - exceptional success without mistakes or with minor mistakes, 95-100 points b) 9 (B) - above average, with some mistakes, 85-94 points c) 8 (C) - average, with noticeable mistakes, 75-84 points d) 7 (D) - generally good, but with significant shortcomings, 65-74 points e) 6 (E) - meets the minimum requirements, 55-64 points f) 5 (F, FX) - does not meet the minimum requirements, less than 55 points The overall evaluation of the student's obligations during the semester and the exam grade is based on the total number of points (%) the student has earned by fulfilling pre-exam obligations and passing partial and final exams, with a maximum of 100 points, and is determined according to the following scale: Student obligations: • Attendance at lectures and exercises • Homework/Seminar/Practical work: 15 points (%) • I Partial exam/Test/Knowledge check: 35 points (%) • Final exam (II Partial): 50 points (%)
Literature:	Mandatory: • Course material available on the Faculty website. Supplementary: • A. Bensky, Wireless Positioning Technologies and Applications, Artech House, 2008 • R. Mautz, Indoor Positioning Technologies, Školska knjiga, Zurich, 2012 • J. Figueiras, S. Frattasi, Mobile Positioning and Tracking, Wiley, 2010 • A. Tanenbaum, D. Wetherall, Computer Networks (5th edition), Mikro knjiga, 2012

Course code: 09-10-1CPTES020202PL	**Course title: QUALITY MANAGEMENT IN LOGISTICS**		
Level: II	**Year:** I	**Semester:** II	**Number of ECTS credits:** 6
Status: Elective course		**Total number of contact hours:** 90	

	Lectures: 45 **Tutorials:** 30 **Laboratory work:** 15
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course**
Prerequisite for enrollment:	No
Course goal (goals):	Fundamental business concepts based on quality improvement and their application in the daily operations of a postal operator.
Topics covered (Units of study):	1. Introduction to the field of quality and quality management 2. Quality in logistics 3. Measuring the quality of logistics services 4. Examples of measuring logistics service quality 5. Measuring customer satisfaction 6. Decision-making models for logistics service quality 7. Measuring performance indicators 8. Quality management methods 9. Benchmarking concept 10. Quality management system standards 11. TQM (Total Quality Management) concept 12. HACCP system 13. Integrated management systems
Learning outcomes:	Knowledge: Students who complete this course will gain knowledge of quality management in logistics. Skills: Collaboration in learning through pair or group work, presentation skills, research skills on assigned topics. Competencies: Improvement of quality and its application in the daily operations of logistics operators.
Teaching methods:	Oral presentation method, discussion method, demonstration method, group work method.
Assessment methods with grading structure:	Assessment of creativity in lectures and exercises, along with the creation of independent projects, the score of the partial test during classes, and the score of the final exam. The criteria for monitoring and evaluating student performance during the course are as follows: Homework/Seminar/Practical Work: 15 points (%), passed if at least

	55% is achieved. Partial Exam/Test/Knowledge Assessment: 35 points (%), passed if at least 55% is achieved. Final Exam (II Partial): 50 points (%), passed if at least 55% is achieved. Final Exam (Comprehensive): 85 points (%), passed if at least 55% is achieved. The final exam is organized as a written/oral exam. During the final exam, a student may take material that they did not pass and/or successfully complete during the semester. The necessary condition for successfully passing the exam is to achieve a score of at least 55% of the maximum points on the partial and final exam, while a sufficient condition is that the total number of points (from homework, attendance, partial and final exams) is 55. Homework is organized through writing assignments and projects. There is no opportunity for correction on homework. For students who did not successfully complete the partial exam, the final exam consists of all material covered during the course. The retake exam is organized similarly to the final exam. The final success of the student, after all prescribed forms of knowledge assessment, is evaluated and graded according to the following grading system: a) 10 (A) - exceptional success without errors or with minor errors, carries 95-100 points; b) 9 (B) - above average, with some errors, carries 85-94 points; c) 8 (C) - average, with noticeable errors, carries 75-84 points; d) 7 (D) - generally good, but with significant deficiencies, carries 65-74 points; e) 6 (E) - meets minimal conditions, carries 55-64 points; f) 5 (F, FX) - does not meet minimal conditions, less than 55 points. The overall evaluation of all student obligations during the semester, i.e., the exam grade is based on the total number of points (%) that the student earned by fulfilling pre-exam obligations and taking the partial and final

	exams, according to the quality of acquired knowledge and skills, and contains a maximum of 100 points, determined according to the following scale: **Student Obligations** — **Points (%)** Attendance in lectures and exercises... - Homework/Seminar/Practical Work... 15 points (%) Partial Exam/Test/Knowledge Assessment... 35 points (%) Final Exam (II Partial)... 50 points (%) Final Exam (Comprehensive)... 85 points (%)
Literature:	Mandatory: 1. Kilibarda, M. J. i S. M. Zečević, Upravljanje kvalitetom u logistici, Saobraćajni fakultet, Beograd, 2008 2. Pejović, M. J. i Z. Krivokapić, Menadžment kvalitetom usluga, Pobjeda, Podgorica, 2007. Supplementary: 1. Lazibat, T., Upravljanje kvalitetom, Znanstvena knjiga, Zagreb, 2009. 2. Juran, J. M. i F. M. Gryna, F. M., Planiranje i analiza kvalitete, MATE, Zagreb, 1999. 3. Injac, N., Mala enciklopedija kvalitete, I., II. i III., Oskar, Zagreb, 2002. 4. Peters, T. i R. Waterman, U potrazi za izvrsnošću, Profil, Zagreb, 2008

Course code: 09-10-2CPTES020202PL	**Course title: MACHINE LEARNING IN LOGISTICS SYSTEMS**		
Level: II	**Year: I**	**Semester: II**	**Number of ECTS credits:** 6
Status: Elective		**Total number of contact hours:** 90 **Lectures:** 45 **Tutorials:** 30 **Laboratory work:** 15	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course**		
Prerequisite for enrollment:	None		
Course goal (goals):	Machine learning aims to enable computers to learn and behave in ways similar to humans. This requires providing data as input to machine		

	learning algorithms, which will utilize it to establish connections and learn how to make decisions and predictions with a certain level of autonomy. The goal of the course is to equip students with the skills to apply machine learning tools and techniques in decision-making for managing logistics processes.
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Basic concepts of the Python programming language 2. Data types 3. Control structures 4. Functions and modules 5. Object-oriented programming 6. Basics of data science (manipulation, analysis, and visualization) 7. NumPy, Pandas, and Matplotlib libraries 8. Data preprocessing and preparation for machine learning algorithms 9. Regression methods in machine learning 10. Classification methods in machine learning 11. Clustering methods in machine learning 12. Associative learning 13. Deep neural networks 14. Dimensionality reduction 15. Practical examples of machine learning methods implementation in logistics systems
Learning outcomes:	**Knowledge:** Theoretical and practical knowledge in the field of machine learning. The course material should ensure a basic understanding of programming and machine learning concepts. **Skills:** Ability to apply knowledge of machine learning algorithms in the field of logistics systems. **Competencies:** Ability to independently identify, analyze, and solve problems in logistics processes using acquired skills and machine learning algorithms.
Sustainable Development Goal (SDG):	SDG4 – Quality Education SDG9 – Industry, Innovation, and Infrastructure
Teaching methods:	Lectures, tutorials, laboratory work/fieldwork/practice. The following methods will be employed: oral presentations, discussions, demonstrations, graphical and software visualizations, and group work. Lectures will cover theoretical concepts, with examples and problem-solving tasks. Additional examples will be explored in tutorials using relevant software tools. Laboratory work/fieldwork will develop

	individual and team skills necessary to complete tasks from the given field.
Assessment methods with grading structure:	Assessment methods with grading structure: Creativity in class and exercises will be evaluated through independent work, partial exams during the course, and a final exam. The grading criteria during the course are as follows: • Homework/seminar work/practical work: 15 points (%), passed if more than 50% is achieved. • I Partial exam/test/knowledge check: 35 points (%), passed if more than 50% is achieved. • Final exam (II Partial): 50 points (%), passed if more than 50% is achieved. The total number of points (%) that a student can achieve during the course is a maximum of 50 points (%), and with the Final exam (II Partial) it totals 100 points (%). For students who do not pass the I Partial exam or the Final exam, a make-up exam is organized, where both parts must be passed with at least 50% of the points. The final success of the student, after all the forms of knowledge assessment, is graded as follows: g) 10 (A) - exceptional success without mistakes or with minor mistakes, 95-100 points h) 9 (B) - above average, with some mistakes, 85-94 points i) 8 (C) - average, with noticeable mistakes, 75-84 points j) 7 (D) - generally good, but with significant shortcomings, 65-74 points k) 6 (E) - meets the minimum requirements, 55-64 points l) 5 (F, FX) - does not meet the minimum requirements, less than 55 points The overall evaluation of the student's obligations during the semester and the exam grade is based on the total number of points (%) the student has earned by fulfilling pre-exam obligations and passing partial and final exams, with a maximum of 100 points, and is determined according to the following scale: Student obligations: • Attendance at lectures and exercises • Homework/Seminar/Practical work: 15 points (%) • I Partial exam/Test/Knowledge check: 35 points (%) • Final exam (II Partial): 50 points (%)
Literature:	Mandatory: • Course material available on the Faculty website.

	• C. Müller and S. Guido, Introduction to Machine Learning with Python: A Guide for Data Scientists, O'Reilly Media, 2016 • S. Shalev-Shwartz and S. Ben-David, Understanding Machine Learning: From Theory to Algorithms, Cambridge University Press, 2014 Supplementary: • Aurélien Géron, Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems, 2019 • R. Johansson, Numerical Python: Scientific Computing and Data Science Applications with NumPy, SciPy, and Matplotlib (2nd edition), 2018 • X. S. Yang, Introduction to Algorithms for Data Mining and Machine Learning, 2019 • NumPy documentation: [https://numpy.org/doc/stable/] • Pandas documentation: [https://pandas.pydata.org/docs/] • Matplotlib documentation: [https://matplotlib.org/] • Scikit-learn documentation: [https://scikit-learn.org/stable/]

Course code: 09-10-3CPTES020202PL	**Course title: ADVANCED MODELING IN LOGISTICS**		
Level: II	**Year: II**	**Semester: III**	**Number of ECTS credits:** 60
Status: Optional course		**Total number of contact hours: 90** Optional breakdown of hours by type: Lectures 45 Tutorials 30 Seminars and Practice 15	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course** [Do not enter names in this section. Use the formulation as indicated in this section]		
Prerequisite for enrollment:	No		
Course goal (goals):	To provide students with knowledge related to the concepts and methods		

	of solving problems of process modeling and optimization in postal-logistics systems, with a special emphasis on solving transport problems that are present in these systems.
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	• Elements of logistics systems • Basic concepts about models. Types of models. Mathematical modeling and application in logistics. • Optimization and modeling process. Models and methods of operational research. Mathematical models in operational research tasks. • Linear programming. Definition of a linear programming problem. Reduction to standard form of linear programming problems. • Linear programming. Graphical method of searching for peak points. • Linear programming. Graphical method of searching for increments of a function. Method of ribbed variations. • Examples of solving logistic problems by optimizing a linear model • Transport problem. Mathematical notation. Balance condition. • Northwest corner method. The method of the smallest element in the price matrix. Vogel's method. • Application of the transportation problem in warehouses, supply chain management systems. • Graph theory. Basic terms in graph theory. • Prim's algorithm. The shortest path method • Application of graph theory to the optimization of postal logistics processes.
Learning outcomes:	Knowledge: After listening and passing the course, the student should have the basic theoretical knowledge necessary for the application of various modeling and optimization methods, with application to postal logistics systems. Skills: With the knowledge acquired in this course, the student will be able to see the role and significance of modeling and optimization for the decision-making process and the benefits that can be realized by their application. Competencies: Students are trained to model optimization problems using appropriate methodologies in order to solve various real problems from postal logistics systems with the help of computers
Sustainable Development Goal (SDG):	SDG4 – Quality Education, SDG8 - Decent work and economic growth, SDG9 - Industry, innovation and infrastructure
Teaching methods:	Teaching is realized through lectures, exercises and the practical part of

	the teaching, which includes laboratory exercises/field work/practice. Lectures are conducted through oral presentations and presentations, during which theoretical aspects are presented along with solving numerical problems and practical examples. At auditory exercises, specific problems are solved and discussed. Algorithms covered in lectures are implemented and demonstrated in laboratory exercises. Classes of problems covered in the lectures are solved. Matlab/Simulink will be used for implementation.
Assessment methods with grading structure:	Grading of students during classes is done in the following way: Activities during classes from 0 to 15 points, Activity (seminar paper / project assignment/assignments): from 0 to 15 points; 1st test / 1st knowledge test / 1st partial exam: from 0 to 35 points. The total number of points that a student can achieve according to the above-mentioned monitoring during classes is a maximum of 65 points. The final/remedial exam includes the material that the student did not pass on the partial exam, which means that it includes the second part (II partial), which is evaluated with 35 points. The total evaluation of all the student's obligations during the semester, that is, the grade on the exam, is based on the total number of points (%) that the student earned by fulfilling the pre-exam obligations and passing the partial and final exams. According to the quality of acquired knowledge and skills, a student can win a maximum of 100 points, according to the following scale: Scoring structure Points (%) Work in the course of teaching:.....15 points (%) Seminar / Project assignment/Tasks:.....15 points (%) 1st test / 1st knowledge test (1st partial exam);..... 35 points (%) Final or remedial exam (Part I+Part II):..... (35+35) 70 points (%) The required condition for passing the exam is to achieve a result of at least 50% of the points from the activities provided for in the partial exam and the final exam, i.e. in order to pass the exam, the student must achieve the following: - 1st test / 1st knowledge test / partial exam: 17.50 points

	- Final or remedial exam (II partial exam): 17.50 points Students who passed the partial exam take only the second part of the material (the part that is not included in the partial exam) on the final exam. Students who did not pass the partial exam, take the material from the partial exam as part of the final / remedial exam in such a way that the exam is organized from the entire material covered during the course (two parts), whereby the criteria for passing the exam remain identical. The final exam is organized as a written and/or oral exam with a practical part. The student's activity is monitored and evaluated through participation in class discussions, preparation of assignments, seminar papers, project assignments or taking quizzes. The final success of the student, after all foreseen forms of knowledge verification, is evaluated and graded using the following system: a) 10 (A) - exceptional success without errors or with minor errors (95-100 points); b) 9 (B) - above average, with some errors (85-94 points); c) 8 (C) - average, with noticeable errors (75-84 points); d) 7 (D) - generally good, but with significant shortcomings (65-74 points); e) 6 (E) - meets the minimum requirements (55-64 points); f) 5 (F, FX) - does not meet the minimum requirements (less than 55 points). The above grading scale can be adjusted according to the Rules for studying at the University of Sarajevo (Article 45).
Literature:	Mandatory: – Husein Pašagić, Matematičko modeliranje i teorija grafova, FPZ, Zagreb, 1998. – D. Lipovac, D. Letić, Metode operacionih istraživanja, Univerzitet u Novom Sadu, Zrenjanin, 1999. – Corne, D., Dorigo, M., Glover, F.: New Ideas in Optimization, Mc Graw Hill, 1999 Crainic, T.G., Laporte, G.: Fleet Managment and Logistics, Kluwer, 1998 Supplementary: – Damir Vučina, Metode inženjerske numeričke optimizacije, FESB, Split, 2005. – Dr. Jovan J.Petrić, Operaciona istraživanja, Knjiga prva, Savremena administracija, V izdanje, 1979.

<table>
<tr><td colspan="2"></td><td colspan="2">– Dr. Jovan J.Petrić, Operaciona istraživanja, Knjiga druga, Savremena administracija, V izdanje, 1979.Dr.
– Aleksandar Zečević, Operaciona istraživanja, Viša poslovna škola Beograd, 2000.</td></tr>
<tr><td>Course code: 11CPTOS020203PL</td><td colspan="3">Course title: IOT IN POSTAL AND LOGISTICS SYSTEMS</td></tr>
<tr><td>Level: II</td><td>Year: II</td><td>Semester: III</td><td>Number of ECTS credits: 6</td></tr>
<tr><td colspan="2">Status: Elective</td><td colspan="2">Total number of contact hours: 90

Lectures: 45
Exercises: 30
Seminars and Project Assignments: 15</td></tr>
<tr><td colspan="2">Course participants:</td><td colspan="2"></td></tr>
<tr><td colspan="2">Prerequisite for enrollment:</td><td colspan="2">No</td></tr>
<tr><td colspan="2">Course goal (goals):</td><td colspan="2">Introduction to IoT technologies and their potential applications in postal and logistics systems. The emphasis is on analyzing how these technologies can be used to develop smart solutions and automate processes in warehouses and supply chain management.</td></tr>
<tr><td colspan="2">Topics covered (Units of study):
(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)</td><td colspan="2">• Introduction to the IoT (Internet of Things) Concept
• IoT Architecture, Infrastructure, and Technologies
• Sensors and Hardware Platforms
• Communication Technologies
• Cloud Technologies and Services
• IoT Systems for Smart Monitoring
• IoT Systems in Warehouses
• IoT Systems for Supply Chain Management
• IoT Systems for Process Automation in Logistics
• Challenges of Applying IoT Technologies in Postal and Logistics Systems
• Perspectives and Development of IoT Solutions in Postal and Logistics Systems</td></tr>
<tr><td colspan="2">Learning outcomes:</td><td colspan="2">Knowledge: Students will be introduced to the IoT paradigm and technologies, with a particular focus on the opportunities and challenges of applying them in postal and logistics systems.

Skills: Students will acquire the necessary tools for designing and developing IoT systems, including software tools, network configuration, and hardware.</td></tr>
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	Competencies: Upon passing the exam, students will be able to plan, design, and develop IoT systems to enhance processes in postal and logistics systems, selecting appropriate technologies for developing specific solutions.
Sustainable Development Goal (SDG):	**SDG 9 – Industry, Innovation, and Infrastructure** **SDG 11 – Sustainable Cities and Communities**
Teaching methods:	The teaching is conducted through lectures, exercises, seminars, and practical components, including laboratory exercises and/or fieldwork/internships. Lectures are delivered through oral presentations with slides and practical examples. During the course, discussions on the challenges of designing and developing systems based on advanced internet technologies are encouraged. Students will be required to prepare and present seminar papers and/or project assignments. Various methods are used during the course, including: oral presentations, discussions, demonstrations, individual and group work, etc.
Assessment methods with grading structure:	The total number of points a student can earn during the course is 50, with an additional 50 points available on the final exam. The points during the course are distributed among assignments and activities and/or seminars and/or project tasks, as well as the partial exam. The final/retake exam covers material not passed in the partial exam, which means it includes a second part of the material worth 50 points for students who have passed the partial exam. Students who have not passed the material from the partial exam will need to take both the material from the partial exam and the final exam. The final/retake exam is organized as a written and/or oral exam, along with a practical component. The overall evaluation of all student obligations during the semester, including the final grade, is based on the total number of points earned by fulfilling pre-exam obligations and passing the partial and final exams. According to the quality of acquired knowledge and skills, students can earn a maximum of 100 points, distributed as follows: Grading Structure Points (%) • Seminar / Class Activity / Project Task: 20 points (20%) • First Test / Knowledge Check (First Partial Exam): 30 points (30%)

	• Final or Retake Exam (Second Partial Exam): 50 points (50%) The required condition to pass the exam is 55 points in total, with at least 55% of points earned in the knowledge checks (partial and final/retake exams). The final student performance, after all planned knowledge checks, is graded according to the following system: a) 10 - Excellent performance with no errors or minor errors (95-100 points); b) 9 - Above average, with some errors (85-94 points); c) 8 - Average, with noticeable errors (75-84 points); d) 7 - Generally good, but with significant shortcomings (65-74 points); e) 6 - Meets minimal requirements (55-64 points); f) 5 - Does not meet minimal requirements (less than 55 points).
Literature:	Mandatory: – Alem Čolaković, "Advanced Internet Technologies (LECTURE NOTES)," Faculty of Traffic and Communications, Sarajevo, 2020. Supplementary: – Yang Yang, Xu Chen, Rui Tan, Yong Xiao, "Intelligent IoT for the Digital World: Incorporating 5G Communications and Fog/Edge Computing Technologies," Wiley, 2021. – Vangelis Angelakis, Elias Tragos, Henrich C. Pöhls, Adam Kapovits, Alessandro Bassi, "Designing, Developing, and Facilitating Smart Cities: Urban Design to IoT Solutions," Springer International Publishing, 2017. – Shree Krishna Sharma, Dushantha Nalin K. Jayakody, Symeon Chatzinotas, Alagan Anpalagan, "Communication Technologies for Networked Smart Cities," The Institution of Engineering and Technology, 2021. – John R. Vacca, "Solving Urban Infrastructure Problems Using Smart City Technologies: Handbook on Planning, Design, Development, and Regulation," Elsevier, 2020. – Constandinos X. Mavromoustakis, George Mastorakis, Jordi Mongay Batalla, "Internet of Things (IoT) in 5G Mobile Technologies," Springer International Publishing, 2016. – Anuradha, J., Tripathy, B. K, "Internet of things (IoT) : technologies, applications, challenges and solutions," CRC Press;Taylor & Francis, 2018.

	– Kayhan Zrar Ghafoor, Kevin Curran, Linghe Kong, Ali Safa Sadiq, "Security and Organization within IoT and Smart Cities," CRS Press, 2020. – Hongjian Sun, Chao Wang, Bashar I. Ahmad, "From Internet of Things to Smart Cities: Enabling Technologies," CRC Press;Chapman and Hall/CRC, 2017. – Fadi Al-Turjman (editor), Muhammad Imran (editor), "IoT Technologies in Smart-Cities: From sensors to big data, security and trust (Control, Robotics and Sensors)," The Institution of Engineering and Technology, 2020. – David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton, Jerome Henry, "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things," Cisco Press, 2017. – Al-Turjman, Fadi, "Intelligence in IoT-enabled smart cities," Taylor & Francis;CRC, 2019. – Bharat Chaudhari, Marco Zennaro, "LPWAN Technologies for IoT and M2M Applications," Elsevier, 2020.

Course code: 12CPTOS020203PL	**Course title: TRAFFIC POLICY**		
Level: II	**Year: II**	**Semester: III**	**Number of ECTS credits:** 6
Status: Optional subject		**Total number of contact hours: 90** Optional breakdown of hours by type: Lectures: 45 Tutorials: 30 Seminars and project tasks: 15	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course**		
Prerequisite for enrollment:	No		
Course goal (goals):	Students acquire the basic theoretical knowledge necessary for the study of transport policy: the national importance of the transport system and its integration into European traffic flows, the allocation of positive and negative effects of the integration of transport policy. Pyramidal		

	structure and authority when defining and implementing traffic priorities at the national and international level.
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	- Approaches to the national transport policy: the concept of politics, types of policies, the function of politics as an approach to the national transport policy, - National transport policy components: Transport policy holders, transport policy objectives, transport policy instruments, relationship between transport policy objectives and instruments, - Principles of the national transport policy - Part I: the connection between transport and the economy, coordination of the operation of the transport system and social profitability. - Principles of national transport policy - Part II: Principles of a unified transport system, allocation of resources, ownership and equal work opportunities, choice of transport policy and feasibility of transport policy - Formulation of transport policy: Formulation, evaluation, efficiency of national transport policy. The concept and meaning of determinants of transport policy. - Harmonization of transport policy – Part I: Objectives of common transport policy. General political guidelines of the common transport policy. - Harmonization of transport policy – Part II: Application and discussions on the future of transport within the framework of the common transport policy. - Trans-European transport network – Part I: Guidelines from 1996 and revision of the guidelines for the trans-European transport network from 2004. - Trans-European transport network – Part II: Revision of the 2013 guidelines: integrated network, two-layer structure and corridors of the trans-European transport network. - Trans-European transport network – Part III: Additional funding opportunities for trans-European network projects. Determination of general conditions for financing projects of trans-European networks. - Trans-European transport network - Part IV: Instrument and general objectives for connecting Europe with the trans-European network. Budget of the Instrument for Connecting Europe with the Trans-European Network - Sectoral policies of the EU - Part I: Objective and scope of application of Directive 97/67/EC of the European Parliament and of the Council. Universal postal services. - EU sectoral policies – Part II: Harmonization of bookable postal services. Conditions for providing non-reserved postal services and access to the network. - Sectoral policies of the EU – Part III: Quality of postal services. Harmonization of technical standards according to the interests of users. Board and National Regulatory Authority

	- Sectoral policies of the EU - Part IV: Market rules of postal traffic and European achievements in the field of postal traffic.
Learning outcomes:	**Knowledge:** The ability to create and apply traffic policy respecting the set objectives. **Skills:** Identification of traffic and transport priorities necessary for strategic planning and creation of traffic policy in the micro and macro environment. Define traffic policy goals and acceptable implementation models. Identifies priorities in the area of planning, construction, revitalization of traffic flows, assesses the need for integration and liberalization of internal traffic flows following European and international traffic policy, directives and guidelines as well as traffic flows, but also traffic flows and policies of neighboring countries. **Competencies:** Creation of internal efficient and effective transport system and integration into international and EU transport systems
Sustainable Development Goal (SDG):	Goals of sustainable development and impact on traffic policy: 1. SDG 1 - A world without poverty 2. SDG 2 - A world without hunger 3. SDG 5 – Gender equality 4. SDG 6 – Clean water and sanitation 5. SDG 7 – Affordable energy from clean sources 6. SDG 8 - Decent work and economic growth 7. SDG 9 – Industry, innovation and infrastructure 8. SDG 10 – Reducing inequality 9. SDG 11 – Sustainable cities and communities 10. SDG 12 - Sustainable consumption and production 11. SDG 13 – Climate protection 12. SDG 14 – Conservation of the aquatic world 13. SDG 15 – Preservation of life on earth 14. SDG 16 – Peace, justice and strong institutions 15. SDG 17 – Partnership to the goal
Teaching methods:	The teaching is realized through lectures, exercises and the practical part of the teaching, which includes the creation of project tasks. Lectures are

	conducted through oral presentation with presentation and presentation of examples from practice. It initiates a discussion on the problems of planning, modeling and analysis of information systems. Students will be required to create and present seminar papers and/or project assignments. Different methods are used in teaching, including: oral presentations and discussions, demonstration of examples, methods of graphic and video presentations and strengthening of work in groups using appropriate methodological approaches.
Assessment methods with grading structure:	The criteria for evaluating the student's work and evaluation during classes is as follows: Activity (seminar paper / project assignment): from 0 to 15 points; 1st test / 1st knowledge test / 1st partial exam: from 0 to 35 points. The total number of points that a student can earn during classes is a maximum of 50 points. The final/remedial exam includes the material that the student did not pass on the partial exam, which means that it includes the second part of the material (II partial) which is evaluated with 50 points or consists of the complete material, i.e. I and II partial exam. The total evaluation of all the student's obligations during the semester, i.e. the grade on the exam, is based on the total number of points (%) that the student earned by fulfilling the pre-exam obligations, passing the partial and final exams. According to the quality of acquired knowledge and skills, a student can win a maximum of 100 points, and according to the following scale: Scoring structure: Points (%) Seminar / Project task:..... 15 points (%) 1st test / 1st knowledge test (1st partial exam):..... 35 points (%) Final or remedial exam (II partial exam):..... 50 points (%) The required condition for successfully completing the exam is a score of 55 points, where a minimum of 55% must be achieved in each part of the exam (activity, partial exam, final exam), i.e. in order to pass the

	exam, the student must meet the following conditions: - Activity (seminar paper / project assignment): 9 points - 1st test / 1st knowledge test / partial exam: 19 points - Final or remedial exam (II partial exam): 27 points Students who passed the partial exam take only the second part of the material (the part that is not included in the partial exam) on the final/remedial exam. Students who did not pass the partial exam take the complete material as part of the final/remedial exam, while the criteria for passing the exam remain identical. The final / make-up exam is organized as written and/or oral. The activity can be followed through the creation of homework, seminar papers, project tasks or taking quizzes. The final success of the student, after all the foreseen forms of knowledge verification, is evaluated and graded by the grading system as follows: a) 10 - exceptional success without errors or with minor errors, carries 95-100 points; b) 9 - above average, with some errors, carries 85-94 points; c) 8 - average, with noticeable errors, carries 75-84 points; d) 7 - generally good, but with significant shortcomings, carries 65-74 points; e) 6 - meets the minimum requirements, carries 55-64 points; f) 5 - does not meet the minimum requirements, less than 55 points. The above scale can be adjusted according to the Rules of studying at the University of Sarajevo (Article 45).
Literature:	Mandatory: 1. Juraj Padjen, Traffic policy of Croatia, Masmedia, Zagreb, 2003. 2. Piero Soave, "A brief guide to the European Union", European Parliament, October 2016. 3. Marc Thomas, "A Brief Guide to the European Union", European Parliament, September 2016. 4. Beata Tuszynska and Frederic Gouarderes, "A Brief Guide to the European Union", European Parliament, October 2016. Supplementary:

	1. Directive 97/67/EC OF THE EUROPEAN PARLIAMENT AND COUNCIL OF 15.12.1997. year, "Official Gazette of the European Communities" no. 6/St. 9 of 21.01.1998. year. 2. Directive 2002/39/EC OF THE EUROPEAN PARLIAMENT AND COUNCIL OF 10.06.2002. year, "Official Gazette of the European Communities" no. 6/St. 1 of 05.07.2002. year. 3. Directive 2008/6/EC OF THE EUROPEAN PARLIAMENT AND COUNCIL dated February 20, 2008. on the amendment and Directive 97/67/EC regarding the complete achievement of the internal market of postal services in the Community, "Official Gazette of the European Communities" no. 06/St. 9 of 27.02.2008. year. 4. Directive 2008-68-EZ OF THE EUROPEAN PARLIAMENT AND COUNCIL dated September 24, 2008. "Official Gazette EU 7/Vol. 7" Land transport of controlled substances. 5. Directive 2010/40EU OF THE EUROPEAN PARLIAMENT AND COUNCIL dated 07.07.2010. "Official Gazette of the EU 7/Vol.8" Framework for the introduction of intelligent transport systems in road transport and for connections with other types of transport. 6. DIRECTIVE 2004/54/EC OF THE EUROPEAN PARLIAMENT AND COUNCIL 7 of April 29, 2004 on minimum safety requirements for tunnels in the trans-European road network 7. "DIRECTIVE 2008/96/EC OF THE EUROPEAN PARLIAMENT AND COUNCIL of November 19, 2008 on road infrastructure safety management 8. DIRECTIVE 2009/33/EC OF THE EUROPEAN PARLIAMENT AND COUNCIL of April 23, 2009 on the promotion of clean and energy-efficient vehicles in road transport 9. DIRECTIVE 1999/62/EC OF THE EUROPEAN PARLIAMENT AND COUNCIL of June 17, 1999 on charges for the use of certain infrastructures for heavy goods vehicles 10. DIRECTIVE 2004/52/EC OF THE EUROPEAN PARLIAMENT AND COUNCIL of April 29, 2004 on the interoperability of electronic toll collection systems in the Community 11. DIRECTIVE (EU) 2019/520 OF THE EUROPEAN PARLIAMENT AND COUNCIL of March 19, 2019 on the interoperability of electronic toll collection systems and facilitating the cross-border exchange of information on non-payment of tolls in the Union 12. REGULATION (EC) no. 1072/2009 OF THE EUROPEAN PARLIAMENT AND COUNCIL of October 21, 2009 on common rules for access to the international road freight transport market 13. REGULATION (EC) no. 561/2006 OF THE EUROPEAN PARLIAMENT AND COUNCIL of March 15, 2006 on the harmonization of certain social legislation related to road

	transport and on the amendment of Council Regulation (EEC) no. 3821/85 and (EC) no. 2135/98 and repealing Council Regulation (EEC) no. 3820/85 14. DIRECTIVE 2002/39/EC OF THE EUROPEAN PARLIAMENT AND COUNCIL of June 10, 2002 amending Directive 97/67/EC regarding the further opening of the postal services market in the Community 15. DIRECTIVE 2008/6/EC OF THE EUROPEAN PARLIAMENT AND COUNCIL of 20 February 2008 amending Directive 97/67/EC with regard to the full achievement of the internal market for postal services in the Community. 16. REGULATION (EU) no. 952/2013 OF THE EUROPEAN PARLIAMENT AND COUNCIL of October 9, 2013 on the Customs Code of the Union. 17. REGULATION (EU) 2018/644 OF THE EUROPEAN PARLIAMENT AND COUNCIL of April 18, 2018 on cross-border package delivery services 18. DIRECTIVE (EU) 2019/789 OF THE EUROPEAN PARLIAMENT AND COUNCIL of April 17, 2019 on establishing rules on the exercise of copyright and related rights that apply to certain internet transmissions by organizations for broadcasting and rebroadcasting of television and radio programs and on amending the Council Directive 93/83/EEC 19. REGULATION (EU) 2015/2120 OF THE EUROPEAN PARLIAMENT AND COUNCIL of November 25, 2015 on establishing measures related to open Internet access and amending Directive 2002/22/EC on universal service and user rights in connection with electronic communications networks and services and Regulation (EU) no. 531/2012 on roaming in public mobile communication networks in the Union. 20. REGULATION (EU) 2018/1971 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2018 on the establishment of the Body of European Regulators for Electronic Communications (BEREC) and the BEREC Support Agency (BEREC Office), amending Regulation (EU) 2015 /2120 and repealing Regulation (EC) no. 1211/2009 21. REGULATION (EU) 2019/1150 OF THE EUROPEAN PARLIAMENT AND COUNCIL of June 20, 2019 on promoting fairness and transparency for business users of online mediation services 22. REGULATION (EC) no. 549/2004 OF THE EUROPEAN PARLIAMENT AND COUNCIL of March 10, 2004 on establishing the framework for the creation of a single European sky 23. REGULATION (EC) no. 550/2004 OF THE EUROPEAN PARLIAMENT AND COUNCIL of March 10, 2004 on the provision of air navigation services in the single European sky

	24. REGULATION (EC) no. 552/2004 OF THE EUROPEAN PARLIAMENT AND COUNCIL of 10 March 2004 on the interoperability of the European air traffic management network 25. REGULATION (EU) 2019/712 OF THE EUROPEAN PARLIAMENT AND COUNCIL of April 17, 2019 on the protection of market competition in the air 26. DIRECTIVE 2012/34/EU OF THE EUROPEAN PARLIAMENT AND COUNCIL of 21 November 2012 on the establishment of a single European railway proctor 27. DIRECTIVE (EU) 2016/797 OF THE EUROPEAN PARLIAMENT AND COUNCIL of 11 May 2016 on the interoperability of the railway system in the European Union 28. DIRECTIVE (EU) 2016/798 OF THE EUROPEAN PARLIAMENT AND COUNCIL of May 11, 2016 on railway safety, 29. REGULATION (EU) 2016/796 OF THE EUROPEAN PARLIAMENT AND COUNCIL of May 11, 2016 on the European Union Agency for Railways and repealing Regulation (EC) no. 881/2004 30. REGULATION (EC) no. 1371/2007 OF THE EUROPEAN PARLIAMENT AND COUNCIL31 of October 23, 2007 on the rights and obligations of passengers in rail traffic 31. Notes and slides from lectures (can be downloaded from the official website of the Faculty of Traffic and Communications and distributed electronically to each individual student)

Course code: 13CPTOS020203PL	**Course title: CUSTOMER RELATIONSHIP MANAGEMENT**		
Level: II	**Year: II**	**Semester: III**	**Number of ECTS credits:** 6
Status: Optional course		**Total number of contact hours: 90** Optional breakdown of hours by type: Lectures 30 Tutorials 30 Laboratory Tutorials/Practice/Concert activies 30	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course** [Do not enter names in this section. Use the formulation as indicated in this section]		
Prerequisite for enrollment:	No		

Course goal (goals):	Within the scope of the course, students need to acquire the necessary knowledge, theoretical and practical, to work in customer relations management. The main goal is to understand the importance of cuatomers and the relationships that are built with them, as well as how these relationships can be managed.
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	• Introduction to customer relationship management (CRM): Concept and definition of CRM - a. The need for CRM. • Evolutionary development of marketing management • Approaches to customer satisfaction research. Designing and building the process of continuous monitoring of client satisfaction. Customer orientation as a company culture. • Customer relationship management as a business process. Customer relationship management process. Benefits and costs of customer relationship management. Assessment of the company's readiness to introduce customer relationship management. Organizing and integrating business, employees, technology and processes. Communication strategies in marketing. Collection of customer data. • Customer relationship management as a business process. Predicting customer behavior. Customer segmentation. Customer profitability. Personalization and optimization of communication channels. Modeling interaction with customers. Automating processes in marketing and sales. Planning the customer relationship management program. • Customer relations policy: Defining customer relations management. The importance of knowing your customers. Acquisition of new clients towards retention of existing ones. Customer loyalty. Use of customer data. • Analytical CRM • Customer relationship management tools • Technological basis for client relationship management: Technological basis for client relationship management. Data storage. Customer data analysis and data mining • Electronic business and customer relationship management via the Internet. Additional services to customers via the World Wide Web. Customer privacy issues. Choice of tools for CRM. • CRM system life cycle. Modeling and implementation of CRM systems in telecommunications companies. • CRM system reengineering. • Implementation of CRM solutions in telecommunications companies (strategy implementation, technology implementation). • Operational CRM
Learning outcomes:	Knowledge: Theoretical and practical knowledge in the field of customer relationship management. The subject of study should ensure the level of competence and knowledge necessary to solve everyday

	problems in the specified field. Skills: Ability to apply theoretical and practical knowledge in the field of customer relationship management Competencies: Ability to independently understand and use the knowledge needed to solve specific problems in the field of customer relationship management.
Sustainable Development Goal (SDG):	SDG4 - Quality education, SDG8 - Decent work and economic growth, SDG9 - Industry, innovation and infrastructure, SDG17 - Partnership for the goals
Teaching methods:	Teaching is realized through lectures, exercises, laboratory exercises/field work/practice. The following methods are represented: the oral presentation method, the conversation method, the demonstration method, the graphic works method, the drawing method and the group work method. In the lectures, theoretical concepts and principles are covered with the presentation of descriptive examples and the solving of specific tasks. Additional examples are considered and solved through exercises, laboratory exercises/field work/practice, which enables continuous work and preparation for independent problem solving. During laboratory exercises/field work/practice, the skills necessary for individual and team work will be developed in order to perform tasks in the given area.
Assessment methods with grading structure:	Assessment of creativity in classes and exercises with creation of independent works, assessment of partial test during class as well as assessment of the final exam. The criteria for monitoring the student's work and evaluating it during classes, according to the following method: – Seminar work/practical work/ 20 points (%). – Homework during class: 10 points (%) – I Partial exam/test/knowledge check/35 points (%), passed if more than 50% is won. – Final exam (Oral) 35 points (%), passed if over 50% is won. – Final exam (Integral) 70 points (%), passed if more than 50% is won. The total number of points (%) that a student can achieve according to

	the mentioned monitoring during classes is a maximum of 65 points (%), which with the Final makes 100 points (%). For students who did not pass the 1st Partial exam, the Final exam (Integral) is organized from the entire material covered during classes and exercises, and is evaluated with 85 points (%), which with the seminar work/practical work makes 100 points (%). The final success of the student, after all the foreseen forms of knowledge verification, is evaluated and evaluated by the grading system as follows: a) 10 (A) - exceptional success without mistakes or with minor mistakes, carries 95-100 points; b) 9 (B) - above average, with some errors, carries 85-94 points; c) 8 (C) - average, with noticeable errors, carries 75-84 points; d) 7 (D) - generally good, but with significant shortcomings, carries 65-74 points; e) 6 (E) - meets the minimum requirements, carries 55-64 points; f) 5 (F, FX) - does not meet the minimum requirements, less than 55 points.
Literature:	Mandatory: 1. Lecture material (available on the faculty website) 2. Dyche, J., Dyche, J. (2001). The CRM handbook: A business guide to customer relationship management. Addison-Wesley 3. Greenberg, P. (2002). CRM at the speed of light: Capturing and keeping customers in the Internet in real time. Osborne McGraw-Hill. 4. Peelen, E.: Customer Relationship Management, Pearson Education Limited, Essex, 2005 5. Buttle, F. Customer Relationship Management. 2nd ed., Butterworth-Heinmann, Amsterdam, London, 2009.

Course code: 14-15-1CPTES020203PL	**Course title: MANAGING PROJECTS AND INVESTMENTS IN TRAFFIC AND COMMUNICATIONS**		
Level: II	**Year: II**	**Semester: III**	**Number of ECTS credits:** 6
Status: Elective		**Total Hours**: 90 45 hours of lectures, 30 hours of exercises/seminars, Seminar/Project Assignment: 15	
Course participants:	**Academic staff and associates selected in the field to which the**		

	course belongs/course
Prerequisite for enrollment:	None
Course goal (goals):	The main objectives of the course are to acquire knowledge in project and investment management, understand methods and techniques applied in project and investment management processes, and enable students to practically apply knowledge in this field.
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. General investment concepts: Concept and definition of investments. Types of investments in transportation. 2. Preparation of investment projects: Preliminary feasibility study. Feasibility study. 3. Feasibility study assessment: Financial evaluation. National assessment. Evaluation of investments under uncertainty. 4. Cost-Benefit Analysis: Principles of cost-benefit analysis. Determining costs and benefits. Valuation of costs and benefits. Criteria used in cost-benefit analysis. Applications of cost-benefit analysis. 5. Business Plan: Concept of a business plan. Content of a business plan. 6. UNIDO Methodology: Preparation of industrial projects. Evaluation of industrial projects. 7. Evaluation of investment projects by the World Bank: Global procedure for reviewing and assessing investment projects. Project profitability evaluation. 8. Project Management: Project management concept. Organization for project management. 9. Standard computer programs for project management. 10. Application of project management concepts in transportation. 11. Project realization: Project realization planning. Time planning. Cost and resource planning. 12. Monitoring and control of project realization: Time tracking and control of project realization. Monitoring and control of project resources and costs. 13. Change management in projects. 14. Risk management in projects. 15. Report: Project realization reporting system. Project closure.
Learning outcomes:	Knowledge: Students will acquire knowledge in project and investment management, methods, and techniques applied in project and investment management processes, enabling students to practically apply the knowledge in this field. Skills: Upon completing the course, students will be able to understand project and investment management processes, evaluate appropriate methods in the project management process, evaluate appropriate methods in the investment management process, plan activities for both processes, apply the concept of managing a specific project in a real

	system and business environment, apply the concept of managing investment activities in a real system and business environment, plan, manage, and control the realization of different types of projects in business systems. Competences: Application of acquired knowledge in concrete models.
Sustainable Development Goal (SDG):	· SDG 8: Decent work and economic growth - Promote sustained, inclusive, and sustainable economic growth, employment, and decent work for all. · SDG 9: Industry, Innovation, and Infrastructure - Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation. · SDG 12: Responsible Consumption and Production - Ensure sustainable consumption and production patterns.
Teaching methods:	During the course, the professor presents individual thematic units (ex cathedra), allows students to follow video materials with educational content (DVD video presentations) in the subject area, and organizes discussions on a given topic (interactive teaching). In the exercises, examples and tasks corresponding to theoretical topics are considered and solved, helping students independently solve tasks and develop project programs and seminar papers.
Assessment methods with grading structure:	The criteria for evaluating and grading student work during the course are as follows: • Seminar/Project task: 0 to 15 points; • First Test / First Knowledge Check / First Partial Exam: 0 to 35 points. The total number of points a student can achieve during the course can be a maximum of 50 points. The final/examination includes the material that the student did not pass in the partial exam, which means it covers the second part of the material (second partial) evaluated with 50 points, or it consists of the complete material, i.e., both the first and second partial exams. The total evaluation of all student obligations during the semester and the exam is based on the total number of points (%) that the student achieved by fulfilling pre-exam obligations and passing partial and final exams. Based on the quality of acquired knowledge and

	skills, the student can score a maximum of 100 points according to the following scale: Grading Structure..... Points (%) Seminar/Project task:.....15 points (%) First Test / First Knowledge Check / First Partial Exam: 35 points (%) Final Exam (Second Partial Exam):.....50 points (%) To successfully pass the exam, the student must achieve a result of 55 points, with at least 55% in each part of the exam (activity, partial exam, final exam). That is, to pass the exam, the student must meet the following conditions: • Activity (seminar work/project task): 8 points • First Test / First Knowledge Check / Partial Exam: 19 points • Final Exam (Second Partial Exam): 27 points Students who passed the partial exam take only the second part of the material (the part not covered by the partial exam) in the final exam. Students who did not pass the partial exam take the complete material, and the criteria for passing the exam remain identical. The final exam is organized as a written and/or oral exam. Activity can be monitored through the preparation of homework, seminar papers, project tasks, or taking quizzes. Note: Students are required to attend all forms of teaching, at least 80% of the total number of hours, and attendance is a prerequisite for verification of regular attendance. In justified cases (illness), the student may be absent from classes, for which they must provide a medical certificate. Seminar work and homework will only be graded if submitted by the defined deadlines. Late submissions will not be graded. The final success of the student after all the predicted forms of knowledge assessment is evaluated according to the following grading

	system: a) 10 - exceptional success without mistakes or with negligible mistakes (95-100 points); b) 9 - above average with occasional mistakes (85-94 points); c) 8 - average with noticeable mistakes (75-84 points); d) 7 - generally good but with significant shortcomings (65-74 points); e) 6 - meets the minimum requirements (55-64 points); f) 5 - does not meet the minimum requirements, less than 55 points.
Literature:	Mandatory: 1. Written materials, seminar papers, and lecture slides (available on the Faculty website). 2. Vujadin Vešović, „Upravljanje projektima“, 9. Izdanje, Beograd, 2010. 3. Vladimir B. Depolo, „Upravljanje projektima u saobraćajnom inžinjerstvu“, Beograd, 2010. Supplementary: 1. Petar Jovanović, “Upravljanje investicijama”, 8. izdanje, Beograd, 2013.

Course code: 14-15-2CPTES020203PL	**Course title: COMMUNICATION TECHNOLOGIES AND THE ENVIRONMENT**		
Level: II	**Year: II**	**Semester: III**	**Number of ECTS credits:** 6
Status: Elective		**Total Hours**: 90 45 hours of lectures, 45 hours of exercises/seminars	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course**		
Prerequisite for enrollment:	None		
Course goal (goals):	This course will provide students with the necessary knowledge in the field of communication technologies and their interaction with the environment, the impact of these technologies on human health, the work of international environmental protection agencies, European Directives regarding electronic waste, as well as the generation, use, and disposal of electronic waste.		

Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. ECOLOGICAL ASPECTS OF ENVIRONMENTAL PROTECTION The concept of knowledge management. Acquisition and storage of system knowledge. Ecology of system knowledge. 2. ECOLOGICAL ASPECTS OF ENVIRONMENTAL PROTECTION Global warming. Hazardous substances that damage the ozone layer. 3. INTERNATIONAL ORGANIZATIONS FOR ENVIRONMENTAL PROTECTION 4. TELECOMMUNICATION TRAFFIC IN INTERACTION WITH THE ENVIRONMENT New technologies in the field of telecommunications traffic. Environmental policy and modern trends in telecommunications. 5. TELECOMMUNICATION TRAFFIC IN INTERACTION WITH THE ENVIRONMENT The state and perspectives of the development of telecommunications technologies in traffic as a consequence of sustainable development. Green IT. 6. MODERN TRENDS IN ICT EQUIPMENT PRODUCTION Ecological aspects in the production and use of ICT equipment. Recommendations for sustainable use. 7. EUROPEAN DIRECTIVES REGARDING ELECTRONIC WASTE WEEE Directive on electrical and electronic waste. RoHS Directive on the restriction of hazardous substances. 8. IMPACT OF ELECTROMAGNETIC RADIATION ON HUMAN HEALTH Thermal and non-thermal effects of radiation. Penetration of electromagnetic waves into the body. 9. INTERNATIONAL CLIMATE CHANGE AGREEMENTS SIGNED IN KYOTO AND MONTREAL 10. GENERATION AND USE OF ELECTRONIC WASTE. METHODS OF DISPOSAL OF ELECTRONIC WASTE. HANDLING ELECTRONIC WASTE IN BOSNIA AND HERZEGOVINA 11. DECARBONIZATION AND INCREASING THE SHARE OF RENEWABLE ENERGY SOURCES AS A RESPONSE TO CLIMATE CHANGE 12. ENVIRONMENTAL MANAGEMENT SYSTEM. SMART GREEN CITIES

	13. SUSTAINABLE DEVELOPMENT GOALS AND EDUCATION FOR SUSTAINABILITY: AWARENESS OF CLIMATE CHANGE AND ACHIEVING THE GOALS OF AGENDA 2030 14. ICNIRP STANDARD. SAR MEASUREMENTS 15. GREEN IoT
Learning outcomes:	Knowledge: Students will gain a comprehensive understanding of the interaction between communication technologies and the environment, including their impact on human health, the ecological aspects of ICT equipment, and relevant international and European regulations. They will also learn how the Sustainable Development Goals (SDGs), particularly those related to responsible production, climate action, and industry and innovation, apply to the management of communication technologies. Skills: Students will develop the ability to analyze and identify key issues related to the impact of communication technologies on the environment and human health, and apply the acquired knowledge in real-world situations. They will also enhance their critical thinking skills and the ability to make informed decisions in line with European directives and sustainable development practices. Competencies: Students will be competent in identifying and solving problems related to the impact of communication technologies on the environment and health, using sustainable development methods. They will be able to apply international standards and directives in practice and develop strategies for the sustainable management of communication technologies.
Sustainable Development Goal (SDG):	"SDG4 – Quality Education," "SDG7 – Affordable and Clean Energy," "SDG9 – Industry, Innovation, and Infrastructure," "SDG11 – Sustainable Cities and Communities," "SDG12 – Responsible Consumption and Production," "SDG13 – Climate Action."
Teaching methods:	Oral Presentation Method Discussion Method Demonstration Method Group Work Method
Assessment methods with	**Assessment of creativity during lectures and exercises through**

grading structure:	**independent work, evaluation of the partial test during the course, and the final exam. The criteria for student monitoring and assessment during the course are as follows:** • Homework/Seminar Paper/Tests: 20 points (%), passed if at least 55% is achieved. • First Partial Exam/Test/Knowledge Assessment: 30 points (%), passed if at least 55% is achieved. • Final Exam (Second Partial) written: 40 points (%), passed if at least 55% is achieved. The condition for taking this exam is a successfully passed first partial exam. • Final Exam (Integral written) 70 points + 10 points oral exam (%), passed if at least 55% is achieved. The final exam is organized as both a written and an oral exam. During the final exam, the student can take the material that was not covered and/or successfully completed during the semester. A required condition for successfully passing the exam is achieving at least 55% of the maximum number of points on both the partial and final parts of the exam. The sufficient condition is that the total sum of points (from homework, attendance, partial, and final exams) reaches 55. Homework is organized through writing assignments and projects and cannot be revised. For students who have not successfully completed the partial exam, the final exam covers the entire material taught during the course. The make-up exam is organized in the same manner as the final exam. **The final student success after all forms of knowledge assessment is evaluated and graded according to the following system:** • a) 10 (A) - outstanding performance with no or minor errors, 95-100 points; • b) 9 (B) - above average, with some errors, 85-94 points; • c) 8 (C) - average, with noticeable errors, 75-84 points; • d) 7 (D) - generally good, but with significant shortcomings, 65-74 points; • e) 6 (E) - meets the minimum requirements, 55-64 points; • f) 5 (F, FX) - does not meet the minimum requirements, less than 55 points. **The overall evaluation of all student obligations during the semester, and the exam grade, is based on the total number of points (%) the**

	student has acquired by fulfilling pre-exam obligations and taking partial and final exams. The grading system is defined as follows, with a maximum of 100 points: **Student Obligations Points (%)** • Attendance at lectures and exercises: - • Homework/Seminar Paper/Tests: 20 points (%) • First Partial Exam/Test/Knowledge Assessment: 30 points (%) • Final Exam (Second Partial): 40 points (%) • Final Exam (Oral): 10 points (%) • Final Exam (Integral): 70 points (%)
Literature:	Mandatory: 4. Internal Script "Communication Technologies and the Environment," Faculty of Traffic and Communications, Sarajevo, 2022. 5. Manatū Mō Te Taiao - Information and Communication Technology Equipment: Good Practice Guidelines for Environmental Sustainability 6. Nik Bessis, Ciprian Dobre (Editors), "Big Data and Internet of Things: A Roadmap for Smart Environments," Springer, Volume 546, London, 2014. Supplementary: 1. The Global Goals Resources: https://www.globalgoals.org/resources 2. UN SDG Knowledge Platform: https://sustainabledevelopment.un.org/ 3. Čaušević S, "Communication Technologies and the Environment," University of Sarajevo, Faculty of Traffic and Communications, Sarajevo, 2006. 4. Lecture notes and presentations.

Course code: 14-15-3CPTES020203PL	**Course title: METHODOLOGY OF SCIENTIFIC AND SCHOLARLY RESEARCH**		
Level: II	**Year: II**	**Semester: III**	**Number of ECTS credits:** 6
Status: Elective Course		**Total number of contact hours: 90** Lectures: 45 hours Exercises: 30 hours	

	Seminars and Project Tasks: 15 hours
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course** [Do not enter names in this section. Use the formulation as indicated in this section]
Prerequisite for enrollment:	No
Course goal (goals):	Through lectures, exercises, seminar work, and practical assignments, students should acquire the necessary basic and additional knowledge in the field of scientific and professional research methodology. The course "Methodology of Research and Scientific Work" aims to provide a comprehensive understanding of all principles, methods, objectives, and instruments of research and scientific work, as well as the process of defining and implementing the creation of scientific and professional papers.
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	13. Introduction to the Methodology of Research Work. The function of research work. 14. Science of Sciences. Definition of science. 15. Basic characteristics of science. 16. Functions of science – research work: Fundamental research. 17. Applied research. Developmental research. Individual and team research. 18. Basic research methods. 19. Classification and selection of methods. 20. Technology of research work, identifying the research problem, and its function. 21. Selection and analysis of the topic. 22. Compiling a working bibliography: manuals, encyclopedias, dictionaries, monographs. 23. How to define the subject and objective of research? 24. What is a research result, and how is it verified? 25. Writing and presenting research work reports. 26. Concept, introduction, problem statement, argumentation, and discussion of results. 27. Writing the choice of research method. 28. Writing master's theses.
Learning outcomes:	Knowledge: Theoretical and practical knowledge in the field of scientific and research activities. The course should ensure a level of competence and knowledge necessary to address everyday problems in this field. Skills: Ability to apply theoretical and practical knowledge in the field

	of scientific and research activities. Competencies: Ability to independently understand and utilize knowledge needed to solve specific problems in the field of scientific and research activities.
Sustainable Development Goal (SDG):	SDG4 – "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all"; SDG5 – "Achieve gender equality and empower all women and girls"; SDG9 – "Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation."
Teaching methods:	The course is delivered through lectures, exercises, laboratory exercises/fieldwork/practice. The following methods are employed: oral presentation, discussion, demonstration, graphic work, drawing, and group work. Lectures cover theoretical concepts and principles, including descriptive examples and the resolution of specific tasks. Additional examples are discussed and solved through exercises, laboratory work/fieldwork/practice, facilitating continuous work and preparation for independent problem-solving. In laboratory exercises/fieldwork/practice, skills needed for both individual and team tasks are developed to address assignments within the given field.
Assessment methods with grading structure:	Evaluation of Creativity in Class and Exercises, Including Independent Work, Partial Test Assessment During Classes, and Final Exam Assessment. The criteria for tracking student performance and grading during classes are as follows: • Homework/Seminar Paper/Practical Work: 15 points (%), passed if more than 50% is achieved. • First Partial Exam/Test/Knowledge Check: 35 points (%), passed if more than 50% is achieved. • Final Exam (Second Partial Exam): 50 points (%), passed if more than 50% is achieved. • Final Exam (Comprehensive): 85 points (%), passed if more than 50% is achieved. The total number of points (%) a student can achieve through class participation and assessments is a maximum of 50 points (%), which, combined with the Final Exam (Second Partial), totals 100 points (%).

	For students who did not pass the First Partial Exam, the Final Exam (Comprehensive) is organized for all covered material during classes and exercises and is valued at 85 points (%), combined with the seminar paper/practical work for a total of 100 points (%). The final student success, after all the foreseen forms of knowledge assessment, is evaluated and graded according to the following system: • 10 (A) - Outstanding performance with no or minor errors, worth 95-100 points. • 9 (B) - Above average, with some errors, worth 85-94 points. • 8 (C) - Average, with noticeable errors, worth 75-84 points. • 7 (D) - Generally good, but with significant shortcomings, worth 65-74 points. • 6 (E) - Meets minimum criteria, worth 55-64 points. • 5 (F, FX) - Does not meet minimum criteria, less than 55 points. Total Assessment of All Student Obligations During the Semester, or Exam Grade Based on the Total Number of Points (%): • Attendance at Lectures and Exercises: - • Homework/Seminar/Practical Work: 10 points (%) • Workshop: 5 points (%) • First Partial Exam/Test/Knowledge Check: 35 points (%) • Final Exam (Second Partial): 50 points (%) • Final Exam (Comprehensive): 85 points (%)
Literature:	Mandatory: 1. Š. Čekić: Osnovi metodologije i tehnologije izrade znanstvenog istručnog djela, Fakultet za saobraćaj i komunikacije, Sarajevo,1999 2. S. Dubić: Uvođenje u naučni rad, Zavod za izdavanje udžbenika,Sarajevo 1970. 3. M.Šamić: Kako nastaje naučno djelo, Svjetlost, Sarajevo,1980. 4. M.Vujović: Uvođenje u znanstveni rad, Informator, Zagreb, 1983 5. M. Filipović: Metodologija znanosti i znanstvenog rada,Svjetlost,Sarajevo 2004. 6. V. Silubrčić: Kako sastaviti, obajaviti i ocjeniti znanstveno djelo,Zagreb, 2003. 7. L. Kuba – Dž. Koking: Metodologija izrade naučnog teksta, CID;Podgorica,2004. 8. S. Kukić: Metodologija znanstveno istraživačkog rada,Ekonomski Fakultet, Mostar 2005.