UNIVERZITET U SARAJEVU

FAKULTET ZA SAOBRAĆAJ I KOMUNIKACIJE

STUDIJSKI PROGRAMA
CESTOVNI SAOBRAĆAJ
I 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.);

OBAVEZNI PREDMETI za sve odsjeke i usmjerenja

R.b	Šifra predmeta	Naziv predmeta	Semestar					
			I	ECTS	II	ECTS	III	ECTS
1.	01ATCOS010101	INŽENJERSKA MATEMATIKA I	3+3	6				
2.	02ATCOS010101	INŽENJERSKA GRAFIKA	4+2	6				
3.	03ATCOS010101	OSNOVI SAOBRAĆAJNIH I KOMUNIKACIJSKIH SISTEMA	4+2	6				
4.	04ATCOS010101	RAČUNARSTVO I INFORMATIKA	4+2	6				
5.	05ATCOS010101	ELEKTROTEHNIČKI SISTEMI U SAOBRAĆAJU I KOMUNIKACIJMA	3+2+1	6				
6.	06ATCOS010102	INŽENJERSKA MATEMATIKA II			3+3	6		
7.	07ATCOS010102	TEHNIČKA MEHANIKA			3+3	6		
8.	08ATCOS010102	SAOBRAĆAJ I PROSTOR			4+2	6		
9.	09ATCOS010102	INDUSTRIJSKI TRANSPORT			3+3	6		
10.	10ATCOS010102	LOGISTIKA U SAOBRAĆAJU I KOMUNIKACIJAMA			4+2	6		
11.	11ATCOS010203	PRIMJENJENA MATEMATIKA I STATISTIKA					4+2	6
12.	12ATCOS010203	SISTEMSKO INŽINJERSTVO					4+2	6
13.	13ATCOS010203	EKONOMIKA U SAOBRAĆAJU I KOMUNIKACIJAMA					3+2+1	6
14.	14ATCOS010203	INFORMACIONI SISTEMI U SAOBRAĆAJU I KOMUNIKACIJAMA					2+2+2	6
15.		IZBORNI PREDMET III semestra					4+2	6
Broj kredita/sati				30		30		30

Izborni predmeti

Šifra predmeta	Naziv predmeta	Broj sati			ECTS	Semestar
		P	V	L/PR		
15-1ATCES010203	ELEMENTI TRANSPORTNIH SREDSTAVA I UREĐAJA	4	2	0	6	**III**
15-2ATCES010203	INFORMACIJE I KOMUNIKACIJE	4	2	0	6	**III**

NASTAVNI PLAN ZA ODSJEK: SAOBRAĆAJ

USMJERENJE: CESTOVNI SAOBRAĆAJ

R.b.	Šifra predmeta	Naziv predmeta	Status	SEMESTAR					
				IV	ECTS	V	ECTS	VI	ECTS
16.	16TRTOS010204	CESTOVNA VOZILA	Obavezni	3+2+1	6				
17.	17TRTOS010204	TEORIJA SAOBRAĆAJNIH TOKOVA	Obavezni	4+2	6				
18.	18TRTOS010204	MATERIJALI I ROBE U TRANSPORTU	Obavezni	4+2	6				
19.		IZBORNI PREDMET: CESTOVNI SAOBRAĆAJ (IV SEMESTAR)	Izborni	3+2+1	6				
20.		IZBORNI PREDMET: CESTOVNI SAOBRAĆAJ (IV SEMESTAR)	Izborni	3+2+1	6				
21.	21TRTOS010305	TEHNOLOGIJSKI MARKETING	Obavezni			3+2+1	6		
22.	22TRTOS010305	INTELIGENTNI TRANSPORTNI SISTEMI	Obavezni			3+2+1	6		
23.	23TRTOS010305	INFRASTRUKTURA CESTOVNOG SAOBRAĆAJA	Obavezni			3+2+1	6		
24.		IZBORNI PREDMET: CESTOVNI SAOBRAĆAJ (V SEMESTAR)	Izborni			3+2+1	6		
25.		IZBORNI PREDMET: CESTOVNI SAOBRAĆAJ (V SEMESTAR)	Izborni			3+2+1	6		
26.	26TRTOS010305	PRAKSA	Obavezni			2	2		
27.	27TRTOS010306	SIGURNOST CESTOVNOG SAOBRAĆAJA	Obavezni					3+2+1	6
28.	28TRTOS010306	TEHNOLOGIJA CESTOVNOG TRANSPORTA	Obavezni					3+2+1	6
29.	29TRTOS010306	PLANIRANJE CESTOVNOG SAOBRAĆAJA	Obavezni					3+2+1	6
30.		IZBORNI PREDMET: CESTOVNI SAOBRAĆAJ (VI SEMESTAR)	Izborni					3+2+1	6
31.		IZBORNI PREDMET: CESTOVNI SAOBRAĆAJ (VI SEMESTAR)	Izborni					3+2+1	6
Broj kredita/sati					30		30		30

Izborni predmeti: usmjerenje: Cestovni saobraćaj

Šifra predmeta	Naziv predmeta	Broj sati			ECTS	Semestar
		P	V	L/PR		
19-20-1TRTES010204	LOGISTIČKI SISTEMI	3	2	1	6	**IV**
19-20-2TRTES010204	ŠPEDITERSKO POSLOVANJE	3	2	1	6	**IV**
19-20-3TRTES010204	VERTIKALNI TRANSPORT	3	2	1	6	**IV**
24-25-1TRTES010305	TEHNIČKA EKSPLOATACIJA CESTOVNIH VOZILA	3	2	1	6	**V**
24-25-2TRTES010305	MULTIMODALNI TRANSPORT	3	2	1	6	**V**

24-25-3TRTES010305	NADZOR I REGULISANJE CESTOVNOG SAOBRAĆAJA	3	2	1	6	**V**
30-31-1TRTES010306	DIJAGNOSTIKA I ODRŽAVANJE CESTOVNIH VOZILA	3	2	1	6	**VI**
30-31-2TRTES010306	JAVNI GRADSKI PREVOZ	3	2	1	6	**VI**
30-31-3TRTES010306	TRANSPORT I OKOLIŠ	3	2	1	6	**VI**

Opis silabusa na studijskom programu Cestovni saobraćaj na b/h/s jeziku

Šifra predmeta: 01ATCOS010101	**Naziv predmeta:** INŽENJERSKA MATEMATIKA I		
Ciklus: I	**Godina: I**	**Semestar: I**	**Broj ECTS kredita: 6**
Status: Obavezni predmet		**Ukupan broj kontakt sati: 90** Opciono razraditi distribuciju sati po tipu: Predavanja 45 Vježbe 45	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet.**		
Preduslov za upis:	Ne		
Cilj (ciljevi) predmeta:	Studenti stiču osnovna znanja za nastavak praćenja matematskih disciplina višeg nivoa koji se javljaju u predmetima: *Inžinjerska matematika II* i *Primjenjena matematika i statistika,* te na taj način stvaraju preduslove za primjenu matematičkog alata u praćenju, razumjevanju i izučavanju fenomena koji se pojavljuju u stručnim predmetima oblasti saobraćaja i komunikacija.		
Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)*	1. Matematička logika: Logičke operacija sa iskazima. Relacije, skupovi i preslikavanja. 2. Skupovi realnih i kompleksnih brojeva: Prirodni brojevi. Matematička indukcija. Newton-ova binomna formula. Razni oblici kompleksnog broja 3. Linearna algebra: Pojam matrice. Operacije sa matricama. Pojam determinante. Sistemi linearnih jednačina: Gauss-ov metod eliminacije, Kramerovo pravilo i Kroneker-Kapelijev stav. 4. Linearna algebra: Vektorska algebra. Operacije sa vektorima. Skalarni proizvod. Vektorski proizvod. Mješoviti proizvod. 5. Analitička geometrija prostora: Ravan u prostoru. Prava u prostoru. Udaljenost tačke od prave. Međusobni odnos dvije prave u prostoru. Međusobni odnos prave i ravni. 6. Nizovi i redovi: Limes niza. Kriterij konvergencije. Monotoni nizovi. Beskonačni red 7. Funkcije realne promjenljive: Svojstva funkcija jedne promjenljive. Granična vrijednost funkcija jedne promjenljive. 8. Diferencijalni račun funkcija jedne promjenljive: Neprekidnost funkcija. Elementarne funkcije 9. Diferencijalni račun funkcija jedne promjenljive: Pojam izvoda funkcija jedne promjenljive . Geometrijsko značenje izvoda. Mehaničko značenje izvoda.		

	10. Diferencijalni račun funkcija jedne promjenljive: Diferencijabilnost i diferencijal funkcije. Izvodi i diferencijali višeg reda. Pravila diferenciranja. 11. Diferencijalni račun funkcija jedne promjenljive:Primjena diferencijalnog računa. Rolleova, Cauchy-jeva i Lagrange-ova teorema. L'Hospital-ovo pravilo. Taylor-ova formula. Maclaurin-ova formula. 12. Ispitivanje funkcija realne promjenljive: Monotonost funkcija . Određivanje lokalnih ekstremnih vrijednosti. Konveksnost, konkavnost i prevojne tačke funkcija. Ispitivanje toka. Crtanje grafika funkcija. 13. Neodređeni integral: Primitivna funkcija i neodređeni integral. Osobine neodređenog integrala. Pravila integriranja. Metode integracije 14. Određeni integral: Osobine određenog integrala. Newton – Leibniz-ova formula. Nesvojstveni (nepravi) integral 15. Primjena određenog integrala u geometriji: Primjena određenog integrala na izračunavanje površine ravne figure, dužine luka krive u ravni, zapremine tijela i površine obrtnih površi.
Ishodi učenja:	Znanje: – rješavaju i primjenjuju sisteme linearnih jednačina, – definiraju i rješavaju probleme opisane vektorima, primjenjujući operacije s vektorima, – pokazaju razumjevanje osnovnih koncepata analize: granične vrijednosti, diferenciranje i integriranje realnih funkcija sa jednom realnom promjenljivom, – primjenjuju procedure diferenciranja u rješavanju problema ekstrema, – crtaju grafike funkcija na bazi primjene prvog i drugog izvoda za njenu analizu, – definiraju i računaju neodređeni integral korištenjem metoda zamjene i parcijalne integracije, – razumiju i primjenjuju procedure za integraciju racionalnih funkcija, koristite integraciju za proračun površine i zapremine. Vještine: potiče kreativnost, preciznost, sistematičnost, apstraktno mišljenje i kritičko razmišljanje koje pomaže pri uočavanju i rješavanju problema, a što je ključno za nastavak školovanja. Kompetencije: prikazivanje i komuniciranje matematičkim jezikom, logičko razmišljenje, argumentiranje i zaključivanje
Cilj održivog razvoja (SDG):	SDG 4 – Kvalitetno obrazovanje SDG 9– Industrija, inovacije i infrastruktura
Metode izvođenja nastave:	Predavanja teorijske nastave uz upotrebu multimedijskih sredstava, tehnika aktivnog učenja i diskusije,praktična nastava – vježbe, te samostalno izlaganje i rješavanje pojedinih konkretnih problema.
Metode provjere znanja sa strukturom ocjene:	Kriterijum vrednovanja rada i ocjenjivanja studenta u toku nastave, vrši se na sljedeći način: Testovi tokom semestra od 0 - 15 bodova; I parcijalni ispit/I test/ I provjera znanja/ od 0 - 35 bodova (položeno ako se osvoji preko 50 %). Ukupan broj bodova koji student prema navedenom praćenju u toku nastave može ostvariti iznosi maksimalno

	50 bodova. Završni ispit se organizuje iz cjelokupnog pređenog gradiva u toku nastave i iznosi najviše 50 bodova, od čega je II parcijalni ispit od 0 - 25 bodova (položeno ako se osvoji preko 50 %) i Teorija i zadaci od 0 - 25 bodova, koji traje 60 min (studenti polažu teoriju i zadatke koje nisu radili na parcijalnim ispitima). Na završnom ispitu studenti mogu popravljati I parcijalni ispit, ako to ranije nisu zadovoljili. Isto vrijedi i za ispitni rok popravni završnog ispita i oba termina jesenjeg ispitnog roka. 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 (%) Mini testovi u toku nastave.....15 bodova (%) I Parcijalni ispit/Test/Provjera znanja/.....35 bodova (%) Završni ispit (II Parcijalni + Teorija) .....50 bodova (%)
Literatura:	Obavezna: 1. M. Uščumlić, P.Miličić, Zbirka zadataka iz više matematike I, Naučna knjiga, Beograd 2. Kostić, V. Hadžiabdić, M. Mehuljić, J. Bektešević, Matematika I – teorija sa urađenim zadacima, Mašinski fakultet Sarajevo, 2011. ISBN 978-9958-601-32-3. 3. Alma Omerspahić, Vahidin Hadžiabdić, Midhat Mehuljić, Jasmin Bektešević, Teorijske osnove i zbirka zadataka iz integralnog računa, Mašinski fakultet Sarajevo, 2012. Dopunska: 1. P. JAVOR: Matematička analiza I, Element, Zagreb,1996. 2. S. KUREPA: Matematička analiza 1 i 2, Tehnička knjiga, Zagreb, 1972.

Šifra predmeta: 02ATCOS010101	**Naziv predmeta:** INŽENJERSKA GRAFIKA		
Ciklus: I (prvi)	**Godina: I (prva)**	**Semestar: I (prvi)**	**Broj ECTS kredita: 6**
Status: Obavezni predmet		**Ukupan broj sati: 90** Predavanja: 60 Vježbe: 30	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**		
Preduslov za upis:	Ne		

Cilj (ciljevi) predmeta:	Osposobljavanje studenata za univerzalno inžinjersko komuniciranje – komuniciranje crtežom, upoznavanje studenata sa osnovama tehničkog crtanja i nacrtne geometrije, te sadržajem i primjenom standarda iz područja grafičkih komunikacija i tehničke dokumentacije. Osposobljavanje studenata za čitanje i razumijevanje tehničkih crteža i različitih tehničkih situacija, sa posebnim osvrtom na saobraćajne situacije. Osposobljavanje studenata za izradu tehničkih crteža upotrebom računarskih alata.
Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)*	1. Uvod – Značaj i primjena grafičkih komunikacija u tehnici 2. Praktični primjeri crteža u oblasti saobraćaja i komunikacija. 3. Računarski programi i CAD sistemi u oblasti saobraćaja i komunikacija. 4. Standardizacija u grafičkim komunikacijama. 5. Tehnički crteži, vrste crteža, načini njihovog formiranja, formati crteža, zaglavlja i sastavnice. 6. Tehničko pismo i tehničko prostoručno skiciranje 7. Vrste linija i njihova upotreba. 8. Konstrukcija krivih linija i kružnih lukova. 9. Mjerila. 10. Predstavljanje predmeta i situacija na crtežima sa osnovama nacrtne geometrije. 11. Projiciranje. Vrste projekcija, aksonometrijska projekcija, izometrija, dimetrija i kosa projekcija. Ortogonalna projekcija i ortogonalno projiciranje. 12. Presjeci, vrste presjeka i srafura. 13. Kotiranje. 14. Crtanje osnovnih standardnih elemenata u oblasti saobraćaja i komunikacija. 15. Računarom potpomognuta izrada 3D modela i tehničke dokumentacije proizvoda i situacija. 16. Upotreba i uvođenje CAD sistema u inžinjerskoj praksi. 17. Historijski razvoj CAD sistema. 18. Osnove CAD sistema. 19. Principi rada CAD sistema. 20. Razlika između 2D i 3D CAD Sistema. 21. Osnove primjene GIS (geografski informacijski sistem) sistema u oblasti saobraćaja i komunikacija.
Ishodi učenja:	Znanje: Razvijanje sposobnosti za samostalno postavljanje i rješavanje jednostavnijih problema iz navedenih oblasti. Usvajaje inžinjerskog pristupa pri rješavanju problema. Vještine: Sposobnost primjene teorijskih i praktičnih znanja iz oblasti inženjerske grafike. Kompetencije: Studenti bi kroz nastavni program i primjere iz realnih situacija trebali biti osposobljeni za grafičko prezentiranje ideja, te univerzalno, nedvosmisleno razumijevanje tehničke dokumentacije uz primjenu standardnih elemenata grafičkog komuniciranja.
Cilj održivog razvoja (SDG):	SDG 4 – Kvalitetno obrazovanje SDG 9– Industrija, inovacije i infrastruktura
Metode izvođenja nastave:	Usmeno iznošenje sa prezentacijom i prikazom različitih problema uz korištenje određenih didaktičkih sredstava, te samostalan rad studenata na

	konkretnim problemima iz oblasti inženjerske grafike.
Metode provjere znanja sa strukturom ocjene:	Kriterijum praćenja rada i ocjenjivanja studenta u toku nastave i kroz parcijalne, završne i popravne ispite. Prema sljedećem načinu: – Redovno prisustvo predavanjima i vježbama 10 bodova. – Projektni zadaci 25 bodova. – I Parcijalni ispit/test/provjera znanja/30 bodova. – II Parcijalni ispit/test/provjera znanja/35 bodova. Ukupan broj bodova koji student prema navedenom praćenju u toku nastave može ostvariti iznosi maksimalno 100 bodova (%). Položio je student koji skupi minimalno 55 bodova prema gornjim kriterijima. Završni i popravni ispit se organizuje za studente koji nisu položili jednu, drugu ili obje provjere znanja. Na završnom i popravnom ispitu može se osvojiti maksimalno 70 bodova, što sa projektnim zadacima i bodovima na osnovu prisustva nastavi čini ukupno 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: Obaveze studenta Bodovi Prisutnost na predavanjima i vježbama... ..... 10 bodova (obavezno je prisustvu svim oblicima nastave min. 80 % i ovo je uslov za ovjeru/potpis urednog pohađanja) Projektni zadaci .....…… 25 bodova I Parcijalni ispit/Test/Provjera znanja/..... 30 bodova II Parcijalni ispit/Test/Provjera znanja/..... 35 bodova Završni ispit (I i/ili II parcijalni) ..... 65 bodova Popravni ispit (I i/ili II parcijalni) ..... 65 bodova
Literatura:	Obavezna: 1. Milan Kljajin i Milan Opalić: Inženjerska grafika, Strojarski fakultet u Slavonskom brodu, 2020. Dopunska: 1. Samir Lemeš: Računarska grafika i geometrijsko modeliranje, Zenica, 2017.

Šifra predmeta: 03ATCOS010101	**Naziv predmeta:** OSNOVI SAOBRAĆAJNIH I KOMUNIKACIJSKIH SISTEMA		
Ciklus: I	**Godina: I**	**Semestar: I**	**Broj ECTS kredita: 6**
Status: Obavezni predmet		**Ukupan broj kontakt sati: 90** Predavanja 60 Vježbe 30	

Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**
Preduslov za upis:	nema
Cilj (ciljevi) predmeta:	Sticanje znanja i vještina potrebnih za razumijevanje strukture i funkcija transportnih,saobraćajnih i komunikacijskih sustava. Usvajanje baznih znanja o transportnim, saobraćajnim i komunikacijskim procesima, načinu njihovog odvijanja i upravljanja.
Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)*	1. Pojam i značaj prometnog i komunikacijskog sustava 2. Osnovne karakteristike transportnog supstrata 3. Transportni uređaji 4. Manipulacijska sredstva i transportna oprema 5. Čovjek kao komponenta prometnog i transportnog sustava 6. Osnovni koncept i funkcije modova transporta 7. Kapacitet i razina usluge transportnog sustava 8. Osnovne karakteristike i izazovi mobilnosti 9. Mod cestovnog transporta 10. Mod željezničkog transporta 11. Mod zrakoplovnog transporta 12. Mod vodnog transporta 13. Mod cjevovodnog transporta 14. Poštanske i komunikacijske tehnologije 15. Informacijsko komunikacijske tehnologije u transportu
Ishodi učenja:	Znanje: Predmet Osnovi saobraćajnih i komunikacijskih sistema treba osigurati potreban nivo znanja o osnovim komponentama i funkcijama transportnih, prometnih i komunikacijskih sustava i specifičnim karakteristikama pojedinih modova transporta te načina odvijanja transportnih i komunikacijskih procesa. Vještine: Predmet Osnovi saobraćajnih i komunikacijskih sistema omogućava stjecanje vještina neophodnih za mjerenje, analizu i procjenu učinkovitosti, sigurnosti, utjecaja na okoliš i ekonomskih koristi od transportnog sustava i pojedinih modova transporta. Kompetencije: Studenti kroz nastavni proces predavanja, vježbe, i seminarski rad trebaju steći odgovarajuće kompetencije za analizu funkcija i karakteristika komponenti transportnog i komunikacijskog sustava i mogućnosti korištenja različitih modova transporta kako bi se iskoristile prednosti svakog moda transporta.
Cilj održivog razvoja (SDG):	"SDG3 – Zdravlje i blagostanje"; "SDG 9 Industrija, inovacije i infrastruktura ", „SDG11- Održivi gradovi i zajednce", SDG 13-Zaštita klime"
Metode izvođenja nastave:	Predavanja, vježbe i seminarski rad.
Metode provjere znanja sa strukturom ocjene:	1. Prisustvo na na nastavi i semiraski rad 15 bodova 2. Prva provjera znanja 35 bodova 3. Završna provjera znanja 50 bodova
Literatura:	Obavezna: 1. Nastavni materijal dostupan na online platformi za učenje Fakulteta za saobraćaj i komunikacije Dopunska: 1. Bert van Wee, Jan Anne Annema: The Transport System and Transport Policy, Edward Elgar, Massachusett s, 2013.

	2. Milan Janić : Advanced Transport Systems, Springer, London, 2014. 3. Mehrdad Ehsani, Fei-Yue Wang: Transportation Technologies for Sustainability, Springer, London, 2012

Šifra predmeta: 04ATCOS010101	**Naziv predmeta:** RAČUNARSTVO I INFORMATIKA		
Ciklus: I	**Godina: I**	**Semestar: I**	**Broj ECTS kredita: 6**
Status: Obavezni predmet		**Ukupan broj sati: 90** Predavanja 60 Vježbe 30	
Učesnici u nastavi	Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet		
Preduslov za upis:	NE		
Cilj (ciljevi) predmeta:	Cilj nastavnog predmeta Računarstvo i informatika je sticanje znanja i ovladavanje vještinama koje doprinose razvoju informatičke pismenosti neophodne za daljni studij. Studenti se trebaju upoznati sa osnovnim karakteristikama računara, načinu rada i njihovim mogućnostima, tj. postići razumjevanje arhitekture računarskih sistema, operativnih sistema i aplikacionog softvera.		
Tematske jedinice:	1. Uvod u računarstvo i informatiku 2. Osnovni pojmovi u računarstvu i informatici i razvoj računara 3. Brojni sistemi i kodovi u računarstvu 4. Arhitektura i komponente računara 5. Uređaji za pohranu podataka 6. Operativni sistemi 7. Aplikativni softver 8. Računarske mreže i usluge 9. Bežične i mobilne mreže 10. Mrežne multimedijalne usluge 11. Alati za izradu web stranica 12. Programski jezici za razvoj softvera 13. Baze podataka 14. Kriptovalute 15. Vještačka inteligencija 16. Sigurnost u računarstvu i informatici 17. Budućnost u računarstvu i informatici		
Ishodi učenja:	Znanje: Studenti će steći teorijska i praktična znanja o računarstvu i informatici, te će se osigurati osnovni nivo znanja o harveru i softveru, te njihovoj primjeni u različitim poljima saobraćaja i komunikacija. Vještine: Očekuje se da studenti ovladaju vještinama i alatima koji se koriste u računarstvu i informatici. Kompetencije: Studenti će biti osposobljeni da učestvuju u aktivnostima u vezi računarstva i informatike u kontekstu saobraćaja i komunikacija.		
Cilj održivog razvoja:	SDG 4 – Kvalitetno obrazovanje SDG 9– Industrija, inovacije i infrastruktura		
Metode izvođenja nastave:	Nastava se realizira kroz izvođenje predavanja, vježbi i praktičnog dijela nastave koja uključuje izradu seminarskih radova. Predavanja se realizuju kroz usmeno izlaganje sa prezentacijom i prikazom primjera iz prakse, te iniciranje diskusije. Studenti će biti obavezni izraditi i		

	prezentirati seminarske radove i/ili projektne zadatake. U realizaciji nastave se koriste različite metode koje uključuju: usmeno izlaganje i diskusije, demonstracije primjera, metoda grafičkih i video prikaza i potenciranje rada u grupama primjenom odgovarajućih metodoloških pristupa.
Metode provjere znanja sa strukturom ocjene:	Kriterijum vrednovanja rada i ocjenjivanja 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 može ostvariti u toku nastave može 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, tj. 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, 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 uspješno okončan ispit je postignut rezultat od 55 bodova pri čemu na svakom dijelu ispita treba ostvariti minimalno 55% (aktivnost, parcijalni ispit, završni ispit), tj. da bi student položio ispit mora ostvariti sljedeće uslove: – 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 / popravnom ispitu polažu samo drugi dio gradiva (dio koji nije obuhvaćen parcijalnim ispitom). Studenti koji nisu položili parcijalni ispit, u okviru završnog / popravnog ispita polažu kompletno gradivo, pri čemu kriteriji za polaganje ispita ostaje identični. Završni / popravni ispit se organizuje kao pismeni i/ili usmeni. Aktivnost se može pratiti kroz izradu zadaće, seminarskih radova, projektnih zadataka ili polaganje kvizova. Konačan uspjeh studenta nakon svih predviđenih oblika provjere znanja, vrednuje se i ocjenjuje sistemom ocjenjivanja kako slijedi: a) 10 - izuzetan uspjeh bez grešaka ili sa neznatnim greškama, nosi 95-100 bodova; b) 9 - iznad prosjeka, sa ponekom greškom, nosi 85-94 bodova; c) 8 - prosječan, sa primjetnim greškama, nosi 75-84 bodova; d) 7 - općenito dobar, ali sa značajnijim nedostacima, nosi 65-74 bodova; e) 6 - zadovoljava minimalne uslove, nosi 55-64 bodova; f) 5 - ne zadovoljava minimalne uslove, manje od 55 bodova.
Literatura:	Obavezna: 1. Milosavljević, M., Veinović, M., Grubor, G.: „Informatika“, Univerzitet Singidunum, Beograd, 2009. 2. Kozić, M.: „Uvod u informatiku i računarstvo“, Mostar, 2006.

	3. Baraković, S., Baraković Husić, J.: „Osnove modelovanja prijetnji u oblasti informaciono-komunikacijskih sistema“, Dobra knjiga, 2022. Dopunska: 1. Plazibat, B., Jerčić, S.: „Informatika“, Veleučilište u Splitu, Split, 2005. 2. Tanenbaum, A.S.: "Structured Computer Organization", 4 izdanje, Prentice Hall, 1999. 3. Mark Burel, „Fundamentals of Computer Architecture“, Palgrave Macmillan, 2003. 4. Hennessy J. L., Patterson D. J.: "Computer Architecture: A Quantitative Approach", Morgan Kaufman. 5. Tanenbaum, A.S.: „Računarske mreže“, prevod četvrtog izdanja, Mikro knjiga, 2005.

Šifra predmeta: 05ATCOS010101	**Naziv predmeta:** ELEKTROTEHNIČKI SISTEMI U SAOBRAĆAJU I KOMUNIKACIJAMA		
Ciklus: I	**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:	Kurs ima za cilj studentima prezentirati osnovne koncepte iz elektrotehničkih sistema u saobraćaju i komunikacijama, te njihovo tretiranje pomoću matematičkih termina. Izlažu se bazni koncepti fenomena u elektrotehnici koji su nužni za bazno oblikovanje budućih inženjera saobraćaja i komunikacija. Studenti trebaju postići znanja vezana za znanstvenu metodologiju i prorodne zakone na način da se fenomenima u elektrotehnici susretnu kako sa kvalitiativnog tako i sa kvantitativnog aspekta.		
Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)*	1. Električno naelektrisanje i materija, Kulonov zakon sile, raspodjela električnih naelektrisanja. Električno polje: definicija, primjeri proračuna. Gausova teorema za električno polje u integralnoj formi. Električni potencijal: rad sila električnog polja, konzervativna priroda električnog polja. Potencijal i razlika potencijala, princip superpozicije pri računanju potencijala. Električni kapacitet: Sistem nabijenih vodiča, izolirani vodič. Definicija električnog kapaciteta, primjeri proračuna kapaciteta. Vezivanje kondenzatora. Elektrostatička energija. Ponašanje i primjena kondenzatora u istosmjernim i izmjeničnim električnim krugovima. Dielektrici i polarizacija materije. 2. Električni krugovi stalnih jednosmjernih struja: definicija električne vodljivosti i stacionarne električne struje, Ohmov zakon, električna vodljivost, električni otpor, specifični električni otpor, serijski i paralelno spojeni otpornici. Joulov zakon. Razmjena energije u električnom krugu. Kirchhoffovi zakoni. Zakon o očuvanju energije		

	u električnom krugu. Metode analize električni krugovi stalnih jednosmjernih struja 3. Magnetno polje: magnetna interakcija, elektricitet i magnetizam. Magnetna sila na električno naelektrisanje u kretanju, magnetna sila na vodič protjecan strujom. Izvori magnetnog polja, Amperov zakon u osnovnom obliku, magnetna svojstva materije: magnetno polje proizvedeno strujom, Biot–Savartov zakon, elektrodinamička sila, magnetna svojstva materije. Električna i magnetna polja promjenjiva u vremenu: karakteristike elektromagnetnog polja, Faradayov zakon elektromagnetne indukcije, Lanzov princip, inducirana elektromotorna sila. Primjena Faradayevog zakona: generatori izmjenične struje, električni motori. Samoindukcija, induktivni električni krug. 4. Električni krugovi vremenski promjenjivih struja sa koncentriranim parametrima. Osnovne električne veličine: napon, struja, snaga. Kirchoffovi zakoni. Dvopoli: otpornik, strujni i naponski izvori, kratak spoj i otvoreni krug. Serijski i paralelni spoj. Elementarni dinamički krugovi: Zavojnica i kondenzator: energija i početno stanje. Krugovi prvog reda (RC i RL) priključeni na istosmjerni napon. 5. Krugovi u stacionarnom sinusoidalnom režimu: Periodički signali i efektivna vrijednost. Odnos između sinusoidalnih signala i fazora. Kirchoffovi zakoni u fazorskom načinu predstavljanja. Impedansa, admitansa, reaktansa i susceptansa dvopola u sinusoidalnom režimu. Analiza dinamičkih krugova u sinusoidalnom režimu (RC, RL i RLC). Aktivna, reaktivna i prividna snaga. 6. Trofazni sistemi, spoj u trokut i zvijezdu, simetrični i nesimetrični režim. Trofazno obrtno polje, princip rada električnih motora. 7. Transformatori, princip rada, Linearni transformator. Osnove rada kolektorskih i asinhronih električnih mašina: Principi i energetski bilans elektromehaničke pretvorbe energije. 8. Osnovna mjerenja električnih veličina. Osnovi mjerne tehnike i račun greške. Osnovna mjerna oprema. Analogni i digitalni mjerni instrumenti. Metode mjerenja električnih velićina. 9. Analogna elektronika, Električne osobine poluvodiča, Elektroni i šupljine. Donori i akceptori. Karakteristike *p-n* (diodnog) spoja: Otvoreni *p-n* spoj. Dioda (*p-n* spoj) kao ispravljač. Direktno polarizirani *p-n* spoj. Inverzno polarizirani *p-n* spoj. Statička karakteristika diode. Primjena linearnog modela diode. Princip rada tranzistora. Struje u tranzistoru. Spoj sa zajedničkim emiterom. Područja rada tranzistora. 10. Osnovi digitalne tehnike. Bullova algebra. Osnovna logička kola. Osnovni spojevi AD I DA konvertora
Ishodi učenja:	Znanje: Teorijska i praktična znaja iz oblasti električnih sistema u saobraćaju i komunikacijama. Osnovne zakonitosti elektrotehnike i elektronike i njihova primjena u inženjerstvu. Vještine: Nakon uspješnog savladavanja kursa student će biti u stanju u daljem školovanju koristiti osnovne zakonitosti iz oblasti električnih sistema. Kompetencije: Student će moći analizirati i predložiti moguće modele i metode rješavanja problema u električnim sistemima

Cilj održivog razvoja (SDG):	SDG4 – Kvalitetno obrazovanje; SDG12 – Održiva potrošnja i proizvodnja
Metode izvođenja nastave:	Sadržaj kursa se izvodi kroz tri aktivnosti: Predavanja u suli za sve studente koje provodi nastavnik i tokom kojih se predstavljaju teorijski aspekti uz rješavanje numeričkih problema i praktičnih primjera. Predavanje se odvija uz korištenje video i audio zapisa. Vježbe tokom kojih se rješavaju i drugi numerički i praktični problemi, a što uključuje rješavanje problema sa prethodnih ispita s ciljem postizanja boljeg razumijevanja prezentiranih teorijskih tema. Laboratorijsve vježbe na kojima se studenti upoznavaju sa praktičnim mjerenjima i načinima korištenja mjerne opreme za prezentaciju pojedinih zakonitosti iz oblasti elektrotehnike. Od studenata se stoga očekuje da redovito sudjeluju u odvijanju svih oblika nastave, kao i da kontinuirano samostalno rade.
Metode provjere znanja sa strukturom ocjene:	Kriterijum praćenja rada i ocjenjivanja studenta u toku nastave i to prema sljedećem načinu: – Domaća zadaća/seminarski rad/ 15 bodova (%), položeno ako se osvoji preko 50 %. – I Parcijalni pismeni ispit/provjera znanja/35 bodova (%), položen je ako se osvoji preko 50 %. – Završni ispit 50 bodova (%) koji se sastoji iz dva dijela: - II parcijalni pismeni ispit/provjera znanja 35 bodova (%), položen je ako se osvoji preko 50 %. - Usmeni ispit 15 bodova (%), nema bodovne granice Ukupan broj bodova (%) koji student prema navedenom može ostvariti u toku nastave iznosi maksimalno 50 bodova (%), što sa Završnim ispitom 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: Obaveze studenta Bodovi (%) Zadaća/Seminarski.....15 bodova (%) I Parcijalni ispit/Provjera znanja.....35 bodova (%) Završni ispit (II Parcijalni/usmeni.....50 bodova (%) Završni ispit (Integralni) .....85 bodova (%)

Literatura:	Obavezna: 1. I. Turković: Bilješke i slajdovi sa predavanja i vježbi 2. E. Hot: Osnovi elektrotehnike, knjiga prva, Sarajevo, 1996. 3. E. Hot: Osnovi elektrotehnike, knjiga druga, Sarajevo, 1996. 4. D Milatović: Osnovi elektronike, Svjetlost, Sarajevo 1995.

Šifra predmeta: 06ATCOS010102	**Naziv predmeta:** INŽENJERSKA MATEMATIKA II		
Ciklus: I	**Godina: I**	**Semestar: II**	**Broj ECTS kredita: 6**
Status: Obavezni predmet		**Ukupan broj kontakt sati: 90** Opciono razraditi distribuciju sati po tipu: Predavanja 45 Vježbe 45	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**		
Preduslov za upis:	Ne		
Cilj (ciljevi) predmeta:	Studenti nadograđuju osnovna znanja sa matematskim tematskim cjelinama višeg nivoa razumjevanja. Na taj način studenti postaju osposobljeni da prepoznaju primjenu tih općih znanja na konkretne praktične probleme (koji proizilaze iz oblasti stručnih predmeta), te da ih samostalno definiraju i rješavaju.		
Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)*	1. Funkcije više varijabli: Osnovni pojmovi. Granična vrijednost i neprekidnost 2. Diferencijalni račun funkcija više varijabli: Diferenciranje. Tangentna ravan i normala prostorne površi. Pracijalni izvod višeg reda. Diferencijal višeg reda. Taylor-ova formula za funkcije dvije promjenljive 3. Diferencijalni račun funkcija više varijabli: Ekstremne vrijednosti funkcija više promjenljivih. Uslovni ekstrem funkcija više promjenljivih. 4. Integralni račun funkcija više varijabli: Izračunavanje dvojnog integrala. Izračunavanje trojnog integrala. 5. Diferencijalne jednačine: Diferencijalne jednačine prvog reda: Diferencijalna jednačina sa razdvojenim promjenljivim. Homogena jednačina. Linearna diferencijalna jednačina. Bernulijeva jednačina. Rikatijeva jednačina. Klerova jednačina. Lagranžeova jednačina. 6. Diferencijalne jednačine: Diferencijalne jednačine višeg reda koje dopuštaju snižavanje reda. Linearne diferencijalne jednačine višeg reda. 7. Diferencijalne jednačine. Sistemi diferencijalnih jednačina. 8. Linijski integrali: Linijski integrali I i II tipa (definicija, osobine, računanje). Nezavisnost linijskog integrala od puta. Greenova formula u ravni. 9. Površinski integrali: Površinskog integrala I i II tipa (definicija, osobine, računanje). Formula Gauss-Ostrogradskog. Stokesova formula.		

	10. Elementi teorije polja i vektorske analize: Skalarno polje i njegove osnovne karakteristike. Vektorsko polje i njegove osnovne karakteristike. Vektorske linije. 11. Elementi teorije polja i vektorske analize: Divergencija vektorskog polja. Green – Gauss-Ostrogradski teorema. Cirkulacija vektorskog polja. Rotor vektorskog polja. Stoksova teorema u vektorskom obliku. Potencijalno polje, soledoidno pole, Laplaceovo polje. 12. Teorija redova: Brojni redovi. Redovi s pozitivnim članovima. Redovi s kompleksnim članovima. 13. Teorija redova: Nizovi i redovi funkcija. Uniformna konvergencija reda. Stepeni red. 14. Teorija redova: Laurentov red. Fourijeov red. 15. Laplasova tranformacija.
Ishodi učenja:	Znanje: - Studenti ovladaju diferencijalnim računom funkcija više promjenljivih, - postavljaju i rješavaju diferencijalne jednačine i primjenjuju ih na konkretnim problemskim zadacima, - rješavaju i primjenjuju sisteme diferncijalnih jednačina, - primjenjuju procedure diferenciranja u rješavanju problema ekstrema funkcija više promjenljivih, - definiraju i računaju dvostruki, trostruk, linijski i površinski integral uz mogućnost prepoznavanje njihove primjene na konkretnim problemima, - pokazaju razumjevanje osnovnih koncepata vektorske analize Vještine: potiče kreativnost, preciznost, sistematičnost, apstraktno mišljenje i kritičko razmišljanje koje pomaže pri uočavanju i rješavanju problema, a što je ključno za nastavak školovanja. Kompetencije: prikazivanje i komuniciranje matematičkim jezikom, logičko razmišljenje, argumentiranje i zaključivanje
Cilj održivog razvoja (SDG):	SDG 4 – Kvalitetno obrazovanje SDG 9– Industrija, inovacije i infrastruktura
Metode izvođenja nastave:	Predavanja teorijske nastave uz upotrebu multimedijskih sredstava, tehnika aktivnog učenja i diskusije,praktična nastava – vježbe, te samostalno izlaganje i rješavanje pojedinih konkretnih problema.
Metode provjere znanja sa strukturom ocjene:	Kriterijum vrednovanja rada i ocjenjivanja studenta u toku nastave, vrši se na sljedeći način: Testovi u toku semestra 0 - 15 bodova; I parcijalni ispit/I test/ I provjera znanja/ od 0 - 35 bodova (položeno ako se osvoji preko 50 %). Ukupan broj bodova koji student prema navedenom praćenju u toku nastave može ostvariti iznosi maksimalno 50 bodova. Završni ispit se organizuje iz cjelokupnog pređenog gradiva u toku nastave i iznosi najviše 50 bodova, od čega je II parcijalni ispit od 0 - 25 bodova (položeno ako se osvoji preko 50 %) i Teorija i zadaci od 0 - 25 bodova, koji traje 60 minuta (studenti polažu teoriju i zadatke koje nisu radili na parcijalnim ispitima). Na završnom ispitu studenti mogu popravljati I parcijalni ispit, ako to ranije nisu zadovoljili. Isto vrijedi i za ispitni rok popravni završnog ispita i oba termina jesenjeg ispitnog roka. 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 (%) Mini testovi u toku nastave.....15 bodova (%) I Parcijalni ispit/Test/Provjera znanja/.....35 bodova (%) Završni ispit (II Parcijalni + Teorija) .....50 bodova (%)
Literatura:	Obavezna: 1. J. Bektešević, V. Hadžiabdić, M. Mehuljić, E. Pilav Teorijske osnove i zbirka riješenih zadataka iz višestrukih, krivolinijskih i površinskih integrala, PMF, Sarajevo 2018. 2. P. Miličić, M. Uščumlić, Zbirka zadataka iz više matematike II, Nauka, Beograd, 1998 3. A.Omerspahić, V.Hadžiabdić, M.Mehuljić, J.Bektešević, Teorijske osnove i zbirka zadataka iz integralnog računa, Mašinski fakultet Sarajevo, Sarajevo 2012. 4. D. Mihailović, D. Đ. Tošić, Elementi matematičke analize II, (Funkcije više promjenljivih, 5. vektorska analiza, višestruki integrali i teorija polja), Naučna knjiga, Beograd, 1976; 1988; 1991. 6. B.P. Demidovič: Zadaci I riješeni primjeri iz više matematike s primjenom na tehničke nauke, Tehnička knjiga, Zagreb, 1963 Dopunska: 1. S. Kurepa: Matematička analiza 2 i 3, Tehnička knjiga, Zagreb, 1976. 2. A.Omerspahić, Matematika 3, Mašinski fakultet Sarajevo, Sarajevo 2012.

Šifra predmeta: 07ATCOS010102	**Naziv predmeta:** TEHNIČKA MEHANIKA		
Ciklus: I	**Godina: I**	**Semestar: II**	**Broj ECTS kredita: 6**
Status: Obavezni predmet		**Ukupan broj kontakt sati: 90** Predavanja 45 Vježbe 45	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**		
Preduslov za upis:	Ne		

Cilj (ciljevi) predmeta:	Usvajanje osnovnih pojmova i zakona: Statike krutog i čvrstog tijela, Kinamatike i Dinamike u cilju osposobljavanja za uspješno praćenje i usvajanja znanja iz drugih stručnih predmeta. Razumjevanje mehaničkih procesa i primjena usvojenih znanja pri rješavanju problema koji se odnose na uslove ravnoteže krutih tijela, analizu naprezanja i dimenzionisanje čvrstih tijela, rješavanje problema koji su vezani za geometriju i kinematičke karakteristike kretanja kao i problema koji uzimaju u obzir i uzroke kretanja. Razvijanje sposobnosti za samostalno postavljanje i rješavanje jednostavnijih problema iz navedenih oblasti. Usvajaje inžinjerskog pristupa pri rješavanju problema.
Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)*	1. Uvod. Statika krutih tijela. Veze i reakcije veza. 2. Sistemi sučeljnihi sila. Statički moment sile za tačku. Spreg sila 3. Redukcija sile na tačku. Proizvoljni sistem sila u ravni. 4. Gredni nosači u ravni 5. Trenje. Težišta 6. Uvod u otpornost materijala.Vanjske sile. Naprezanje. Deformacije 7. Veza između napona i deformacija. Aksijalno naprezanje. 8. Smicanje. Geometrijske karakteristike ravnih presjeka. 9. Savijanje. Uvijanje. 10. Uvod u kinematiku. Kinematika čestice. Pravolinijsko harmonijsko oscilatorno krtanje. 11. Kinematika krutog tijela. Translatorno kretanje. 12. Obrtanje tijela oko nepomične ose. Analiza mehanizama 13. Uvod u dinamiku. Zakoni dinamike.Diferencijalne jednačine kretanja tačke i njihovo integriranje. 14. Opšti zakoni dinamike tačke Rad i snaga 15. Prinudno kretanje tačke i Dalamberov princip, Teorija udara
Ishodi učenja:	Znanje: Poznavanje osnovnih pojmova i zakona: Statike krutog i čvrstog tijela, Kinamatike i Dinamike. Vještine: Sposobnost prepoznavanja problema koji se odnose na uslove ravnoteže krutih tijela, analizu naprezanja i dimenzionisanje čvrstih tijela, rješavanje problema koji su vezani za geometriju i kinematičke karakteristike kretanja kao i problema koji uzimaju u obzir i uzroke kretanja. Sposobnost prepoznavanja osnovnih karakteristika naučnog istraživanja i prenošenja zaključaka i razloga koji su do njih doveli. Kompetencije: Kroz nastavni proces predavanja i vježbi, student će biti sposoban, na osnovu usvojenog znanja da: – Razumije i ukaže na uzroke koji dovode promjene stanja mirovanja i mehaničkog kretanja tijela u prirodi, da odredi kinematičke i dinamičke karakteristike kretanja. – Prati i usvaja znanja iz drugih stručnih predmeta. – Koristi tehničku literaturu, priručnike i tabele iz ove oblasti. – Samostalno postavljati i rješavati jednostavne problema iz navedenih oblasti
Cilj održivog razvoja (SDG):	SGD4 – Kvalitetno obrazovanje; SDG12 – Održiva potrošnja i proizvodnja
Metode izvođenja nastave:	– Samostalno izlaganje – Diskusija

	– Analiza primjera iz prakse(zadaci na vježbama i domaće zadaće)
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 55 %. – I Parcijalni ispit/test/provjera znanja/35 bodova (%), položen je ako se osvoji preko 55 %. – Završni ispit (II Parcijalni) 50 bodova (%), položeno ako se osvoji preko 55 %. – Završni ispit (Integralni) 85 bodova (%), položeno ako se osvoji preko 55 %. 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: Obaveze studenta Bodovi (%) Prisutnost na predavanjima i vježbama.....80 (%) - 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. Dacić,S.: Mehanika u saobraćajnom inženjerstvu, Fakultet za saobraćaj i komunikacije, Sarajevo, 2021. 2. Dacić,S.: Osnovi mašinstva, Fakultet za saobraćaj i komunikacije, Sarajevo, 2007. 3. Dacić,S.:Odabrana poglavlja iz statike krutih i čvrstih tijela, kinematike i dinamike-skripta, Fakultet za saobraćaj i komunikacije, Sarajevo, 2013.

	4. Jurum- Kipke , J.: Mehanika u prometnom inžinjerstvu, Fakultet prometnih znanosti, Zagreb, 2001. 5. Kuzmanović, D., Kastratović, G., Vidanović, N.: Mehanika 1, Univerzitet u Beograd, Sabraćajni fakultet, 2012. 6. Kuzmanović,D., Kastratović, G., Vidanović, N.: Mehanika 2, Univerzitet u Beogradu, Sabraćajni fakultet, 2012. Dopunska: 1. Rusov,L. Mehanika –Statika, Naučna knjiga ,Beograd, 1992. 2. Rusov,L. Mehanika – Kinematika, Naučna knjiga ,Beograd, 1992 3. Rusov,L. Mehanika – Dinamika, Naučna knjiga, Beograd, 1992 4. Beer, F., E.Russel, L., J.Kornwell. P., Vector Mechanics for Engineers, McGraw Hill, 2010. 5. Kuzmanović,D., Kastratović, G., Vidanović, N.: Zbirka zadataka izMehanika 1, Univerzitet u Beograd, Sabraćajni fakultet, 2012.

Šifra predmeta: 08ATCOS010102	**Naziv predmeta:** SAOBRAĆAJ I PROSTOR		
Ciklus: I	**Godina: I**	**Semestar: II**	**Broj ECTS kredita: 6**
Status: Obavezni predmet		**Ukupan broj sati: 90** Predavanja: 60 Vježbe: 30	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**		
Preduslov za upis:	NE		
Cilj (ciljevi) predmeta:	Sticanje edukacijskih znanja iz oblasti saobraćajnog planiranja, i praktična analiza urbanističkog, regionalnog i okolinskog planiranja saobraćaja. Sticanje znanja iz oblasti planskog upravljanja, korištenja zemljišta, zaštite prostora, određivanja dugoročnih ciljeva i mjera prostornog razvoja u skladu sa planiranim ukupnim privrednim, društvenim i historijskim razvojem prostora koji se tretira.		
Tematske jedinice:	1. Uvod – osnove prostornog planiranja 2. Osnovne karakteristike okolinske problematike 3. Mjerenje nivoa društvenog razvoja 4. Prostorna organizacija 5. Razvoj prostornog planiranja i prostorne organizacije u BiH 6. Procjena uticaja na okolinu 7. Zakonski okvir za prostorno planiranje 8. Trendovi razvoja i novi pristup prostornom planiranju 9. Marketing rada 10. Elementi održivog razvoja 11. Prostorni modeli 12. Lokalne inicijative i strateški planovi na lokalnom nivou 13. Nove dimenzije europske politike u prostornom planiranju 14. Prostorni rezultati značajni za Evropu 15. Digitalna tehnologija u prostornom planiranju		
Ishodi učenja:	Znanje: Teorijska i praktična znanja iz oblasti prostornog planiranja saobraćaja. Osnovni propisi, pravila, metode i postupci u oblasti prostornog planiranja u kontekstu saobraćajnog planiranja, kao i analiza		

	saobraćajnih prostornih planova. Vještine: Sposobnost primjene teorijskih i praktičnih znanja iz oblasti prostornog planiranja saobraćaja. Kompetencije: Sposobnosti samostalnog razumijevanja i korištenja propisa, korištenja stručne literature, primjene metoda i postupaka, mjerenja i istraživanja, izrada analiza, procjena i praktičnih rješenja u funkciji realizacije i daljeg poboljšanja prilikom prostornog planiranja saobraćaja.
Cilj održivog razvoja (SDG):	SDG 4 – Kvalitetno obrazovanje SDG 9– Industrija, inovacije i infrastruktura
Metode izvođenja nastave:	Usmeno iznošenje sa prezentacijom i prikazom različitih sistema i procesa iz oblasti prostornog planiranja saobraćaja uz korištenje video i audio zapisa, te samostalno izlaganje pojedinih konkretnih problema na konkretnom području istraživanja. Iniciranje rasprava i diskusija o problemima iz prakse, pojedinačnih zapažanja iz različitih okruženja, izrada samostalnih istraživanja i analiza postojećih prostornih planova saobraćaja odabranog područja.
Metode provjere znanja sa strukturom ocjene:	Ocjena aktivnosti i 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: – Seminarski rad (pismena i usmena provjera) 15 bodova (%), položeno ako se osvoji preko 50 %. – I Parcijalni ispit/test/provjera znanja/ (pismena provjera) 35 bodova (%), položen je ako se osvoji preko 50 %. – Završni ispit (II Parcijalni) (pismena provjera) 50 bodova (%), položeno ako se osvoji preko 50 %. – Završni ispit (Integralni) (pismena provjera) 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 (%). Studenti da bi položili ispit, trebaju položiti svaki od navedenih dijelova (svaki dio minimalno 50%) i to: seminarski rad, prvi parcijalni ispit (test) i završni ispit (drugi parcijalni ili integralni). Evaluacija seminarskog rada i prvog parcijalnog ispita (testa) se realizira u toku trajanja nastave. Studenti ponovci koji u prethodnoj akademskoj godini nisu položili ispit, a koji su ispunili određene obaveze i ostvarili određene bodove, iste mogu prenijeti u tekuću akademsku godinu. Studenti ponovci koji žele izvršiti prenos bodova, trebaju informisati predmetnog nastavnika na početku semestra, do kraja prve sedmice nastave. Prenos bodova se može izvršiti samo jednom. 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.....0 bodova (Studenti su obavezni prisustvovati svim oblicima nastave minimalno 80%, a prisustvo na nastavi je uslov za ovjeru urednog pohađanja nastave. Ukoliko postoje opravdani razlozi, koji moraju biti pisano dokumentirani, studenti mogu izostati i do 30%, a odluku o pravdanju donosi predmetni nastavnik) Seminarski rad/.....15 bodova (%) I Parcijalni ispit/Test/Provjera znanja/.....35 bodova (%) Završni ispit (II Parcijalni) .....50 bodova (%) Završni ispit (Integralni) .....85 bodova (%)
Literatura:	Obavezna: 1. Bublin, M., Planiranje saobraćaja i saobraćajnica, Sarajevo 2007. 2. Bublin, M., Prostorno planiranje i zaštita okoline, Univerzitetska knjiga Sarajevo, 2010 3. Bublin, M., Saobraćaj i prostor, Univerzitetska knjiga Sarajevo, 2000 Dopunska: 1. Appleyard, D., Kerin, L., Majer, R., The viev from the road, Harwaed 2. Čekić, Š., Osnovi metodologije i tehnologije znanstvenog i stručnog dijela, Fakultet za saobraćaj i komunikacije, Sarajevo, 1996. 3. Okvirna prometna strategija BiH, Sarajevo, 2016. 4. The study on the transport master plan in Bosnia and Herzegovina, 2001. 5. Zelenika, R., Livio, J., Suvremeni transportni sustavi, Ekonomski fakultet Rijeka, Rijeka, 1995.

Šifra predmeta: 09ATCOS010102	**Naziv predmeta:** INDUSTRIJSKI TRANSPORT		
Ciklus: I	**Godina: II**	**Semestar: II**	**Broj ECTS kredita: 6**
Status: Obavezni predmet		**Ukupan broj sati: 90** Opciono razraditi distribuciju sati po tipu: Predavanja: 45 Vježbe: 45	
Učesnici u nastavi:	Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet		
Preduslov za upis:	Ne		

<table>
<tr><td>Cilj (ciljevi) predmeta:</td><td>Sticanje edukacijskih oblika u realizaciji programa iz projektovanja i upravljanja u industrijskim tokovima.</td></tr>
<tr><td>Tematske jedinice:
(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)</td><td>
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<tr><td>2.</td><td>Podjela i osnovna obilježja transportne mehanizacije</td><td>(3+3)</td></tr>
<tr><td>3.</td><td>Pribor i pomoćni uređaji</td><td>(3+3)</td></tr>
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</table>
</td></tr>
<tr><td>Ishodi učenja:
(Znanje; vještine; kompetencije)</td><td>Studenti kroz nastavni proces predavanja, vježbe, i praktičan rad trebaju steći odgovarajuća znanja i iskustva za praktičnu primjenu u oblasti projektovanja, izbora, upravljanja i održavanja sredstava unutrašnjeg transporta. Kroz ovaj predmet obezbjeđuje se nivo znanja za optimizaciju industrijskih tokova.</td></tr>
<tr><td>Cilj održivog razvoja (SDG):</td><td>Za predmet "Industrijski transport" ciljevi i podciljevi održivog razvoja (SDG) su:
Cilj 8: Promovirati inkluzivni i održivi ekonomski rast, zaposlenost i dostojanstven rad za sve
Cilj 9: Izgraditi izdržljivu infrastrukturu, promovirati uključivu i održivu industrijalizaciju i poticati inovativnost
Cilj 12: Osigurati održive oblike potrošnje i proizvodnje:</td></tr>
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<tr><td>Literatura:</td><td>Obavezna:</td></tr>
</table>

	1. Ahmić, A., Pretovarna i transportna mehanizacija, Univerzitetska knjiga, Sarajevo, 1996. 2. Marvin I., Prekrcajna mehanizacija, Zagreb, 1997. 3. Dedijer S., Osnovi transportnih uređaja, Građevinska knjiga, Beograd, 1989.

Šifra predmeta: 10ATCOS010102	**Naziv predmeta:** LOGISTIKA U SAOBRAĆAJU I KOMUNIKACIJAMA		
Ciklus: I	**Godina: I**	**Semestar: II**	**Broj ECTS kredita: 6**
Status: Obavezni predmet		**Ukupan broj kontakt sati: 90** Opciono razraditi distribuciju sati po tipu: Predavanja: 60 Vježbe: 30	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**		
Preduslov za upis:	NE		
Cilj (ciljevi) predmeta:	Osnovni cilj predmeta „Logistika u saobraćaju i komunikacijma“ je sticanje znanja o logistici kao filozofiji kvaliteta usluga, tehnološkim promjenama u saobraćaju i komunikacijama, zahtjevima u razvoju logistike, strukturi i potrebama razvoja modernih logističkih centara.		
Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)*	1. Pojam, definicija i razvoj logistike naučne discipline koje se koriste u logistici 2. Podjela i sadržaj logistike prema oblastima u kojima se koristi 3. Pojam, struktura i pocesi logističkih sistema 4. Logistički operatori 5. Skladišta 6. Skladišni procesi 7. Transportni lanac u logističkim sistemima, snabdijevanje i lanac snabdjevanja 8. Skladišni proces u lancu snabdjevanja 9. Zalihe i vrste zaliha 10. Povratna logistika 11. Informacijske i komunikacijske tehnologije u logistici 12. Logistička strategija 13. Utvrđivanje kvaliteta logističke usluge 14. Upravljanje kvalitetom u logistici 15. Savremeni koncept razvoja logističkih centara i logistički centar kao strateški značajan faktor povečanja kvalitete usluga		
Ishodi učenja:	Znanje: Predmet proučavanja treba da osigura nivo kompetencija i znanja potrebnih za rješavanje konkretnih problema u oblasti logistike. Teorijska i praktična znanja iz oblasti logistike u saobraćaju i komunikacijama. Vještine: Razvijene sposobnosti primjene teorijskih i praktičnih znanja iz oblasti logističkih procesa u saobraćaju i komunikacijama. Kompetencije: Razvijene sposobnosti samostalnog razumijevanja i korištenja znanja potrebnih za rješavanje specifičnih problema u oblasti logistike i logističkih procesa.		

Cilj održivog razvoja (SDG):	SDG 8: Dostojanstven rad i ekonomski rast - Promovisati održivi, uključivi i održivi ekonomski rast, zapošljavanje i dostojanstven rad za sve; SDG 9: Industrija, inovacije i infrastruktura - Izgraditi otpornu infrastrukturu, promovirati uključivu i održivu industrializaciju i poticati inovacije; SDG 12: Odgovorna potrošnja i proizvodnja - Osigurati održive obrasce potrošnje i proizvodnje.
Metode izvođenja nastave:	Nastava se realizira kroz usmeno iznošenje sa prezentacijom (ex-katedra) i prikazom različitih sistema i procesa iz oblasti logistike u saobraćaju i komunikacijama uz korištenje video i audio zapisa, te samostalno izlaganje pojedinih konkretnih problema u oblasti logističkih procesa na konkretnom području istraživanja. Iniciranje rasprava i diskusija sa studentima o problemima iz prakse, pojedinačnih zapažanja iz različitih okruženja, izrada samostalnih istraživanja i analiza iz oblasti logistike i logističkih sistema.
Metode provjere znanja sa strukturom ocjene:	Kriterijum praćenja rada i ocjenjivanja studenta u toku nastave i to prema sljedećem načinu: 1. Domaća zadaća/seminarski rad/praktični rad/ max 15 bodova (%), položeno ako se osvoji preko 50 %. 2. I Parcijalni ispit/test/provjera znanja / max 35 bodova (%), položen je ako se osvoji preko 50 %. 3. Završni ispit - pismeni 20 bodova 4. Završni ispit - usmeni 30 bodova 5. Završni ispit (Integralni) - pismeni - 40 bodova 6. Završni ispit (Integralni) - Usmeni - 45 bodova Da bi student položio ispit mora položiti usmeni dio ispita. 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:

	Obaveze studenta _____bodovi Prisutnost na predavanjima i vježbama - obavezno se vodi evidencija. Prisustvo nastavi i vježbama se ne boduje. Zadaća/Seminarski/Praksa/.....max 15 bodova I Parcijalni ispit/Test/Provjera znanja/.....max 35 bodova Završni ispit - pismeni .....max 20 bodova Završni ispit - usmeni .....max 30 bodova Završni ispit (Integralni) - pismeni.....max 40 bodova Završni ispit (Integralni) - usmeni.....max 45 bodova Završni ispit se organizuje na način da studenti koji su položili prvu provjeru znanja polažu samo završni dio ispita (II dio gradiva), dok studenti koji nisu položili prvu provjeru znanja zajedno sa završnim polažu i prvi parcijalni ispit (I dio gradiva). Ispit se polaže pismeno i usmeno. Navedena skala se usvaja prema Pravilima studiranja na Univerzitetu u Sarajevu. Napomena: Studenti su obavezni prisustvovati svim oblicima nastave minimalno 80 % od ukupnog fonda sati. Student može, u opravdanim slučajevima (bolest) odsustvovati sa nastave, za što je obavezan dostaviti zdrastveno opravdanje. Seminarski rad i domaća zadaća će biti bodovane samo ako budu predane prema definisanim terminima. Naknadne predaje istih neće se bodovati.
Literatura:	Obavezna: 1. Bilješke i slajdovi s predavanja (moći će se preuzeti na WEB site-u Fakulteta). 2. BERKOVIĆ, M.: skripta predavanja, „Logistika u saobraćaju i komunikacijama, Fakultet za saobraćaj i komunikacije, 2024. godine. 3. KOSOVAC, A; Muharemović, E.: „Procesi logističkih sistem“, Fakultet za saobraćaj i komunikacije, 2022. godine. 4. ZELENIKA, R.: Logistički sustavi, Ekonomski fakultet u Rijeci, Rijeka 2005. 5. ZELENIKA, R.: Temelji logističke špedicije, Knjiga prva, Sveučilište u Rijeci 2005. Dopunska: 1. ZELENIKA, R.: Prometni sustavi, Tehnologija-organizacija-ekonomika-logistika-menadžment, Sveučilište u Rijeci 2001. 2. OBLAK, H.: Makrologistična politika,Ekonomsko-poslovna fakulteta Maribor, 1996. 3. VASILJEVIĆ, M. R.:“Logistika u saobraćaju“, Univerzitet u istočnom Sarajevu, Saobraćajni fakultet Doboj, Doboj 2015. 4. PERIŠIĆ R.: Sistem kvaliteta usluga logistika i informatika, Institut tehničkih nauka SANU, Beograd, 2002.

Šifra predmeta: 11ATCOS010203	**Naziv predmeta:** PRIMIJENJENA MATEMATIKA I STATISTIKA		
Ciklus: I	**Godina: II**	**Semestar: III**	**Broj ECTS kredita: 6**

Status: Obavezni predmet	**Ukupan broj kontakt sati: 90** Predavanja: 60 Vježbe: 30
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**
Preduslov za upis:	Ne
Cilj (ciljevi) predmeta:	Cilj predmeta je da studenti steknu znanja iz oblasti primjenjene matematike i opšte statistike koje su značajne u saobraćajnim i komunikacijskim naučnim/znanstvenim oblastima (teorije grešaka, osnova numeričke algebre i analize, vjerovatnoće i statistike, te primjena kombinatorike i teorije vjerovatnoće u statistici), kako bi bolje pratili i savlađivali građu pojedinih stručnih predmeta koji obilnije koriste ove važne i sadržajne oblasti savremene matematike.
Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)*	1. Uvod – osnove primijenjene matematike u inženjerstvu (saobraćaju i komunikacijama). Greške približnih vrijednosti brojeva i funkcija 2. Numeričko rješavanje linearnih jednačina i sistema linearnih jednačina, Gaussov algoritam 3. Rješavanje sistema nelinearnih transcendentnih jednačina. Lokalizacija nula polinoma. Određivanje minimuma funkcija 4. Metoda najmanjih kvadrata. Interpolacije i aproksimacije 5. Numeričko diferenciranje i integriranje 6. Zakoni velikih brojeva 7. Elementi kombinatorike 8. Uvod u teoriju vjerovatnoće - Osnove klasične teorije vjerovatnoće (tri klasična koncepta vjerovatnoće, osnovne teoreme ,formula totalne vjerovatnoće i Bajesova formula) 9. Opšta (aksiomatska) definicija pojma vjerovatnoće. Diskretni i nediskretni prostori vjerovatnoće 10. Analiza diskretne i kontinualne slučajne varijable. Funkcija/zakon (gustoće) vjerovatnoće i funkcija distribucije (raspodjele, teorijskog rasporeda) vjerovatnoće 11. Uvod u opštu i matematičku statistiku. Pojam, predmet i značaj statistike (posebno u tehničkim naukama/znanostima). 12. Statistički skup i statističke jedinice. Obilježja statističkih jedinica. Pojam statističkog istraživanja. Deskriptivna statistička analiza, obrada i analiza podataka i rezultata (grafičko prikazivanje statističkih serija, mjere varijacije/disperzije) 13. Metod statističkih uzoraka. Testiranje statističkih (parametarskih i neparametarskih) hipoteza 14. Pojam i predmet regresione analize: regresija i korelacija 15. Dinamička analiza u statistici
Ishodi učenja:	Znanje: Nakon završetka kursa, student bi trebao: – imati razvijen osjećaj za deduktivno rasuđivanje; – razumjeti osnovne pojmove iz oblasti teorije grešaka, numeričke matematike, teorije vjerovatnoće i statistike i tako biti upoznat kako se intuitivni koncepti prevode u precizan matematički jezik; – ovladati standardnim numeričkim, stohastičkim i statističkim metodama i njihovim primjenama ;

	– razumjeti ulogu koju proces linearizacije ima u matematičkom modeliranju konkretnih fizikalnih, saobraćajnih, komunikacijskih i drugih inženjerskih problema; – ovladati osnovnim tehnikama numeričke algebre, numeričke analize, klasične i savremene teorije vjerovatnoće i statistike; – produbiti razumijevanje osnovnih problema iz oblasti inženjerskih matematika 1 i 2. Vještine: potiče kreativnost, preciznost, sistematičnost, apstraktno mišljenje i kritičko razmišljanje koje pomaže pri uočavanju i rješavanju problema, a što je ključno za nastavak školovanja. Kompetencije: prikazivanje i komuniciranje matematičkim jezikom, logičko razmišljanje, argumentiranje i zaključivanje.
Cilj održivog razvoja (SDG):	SDG4 – Kvalitetno obrazovanje, SDG9 – Industrija, inovacije i infrstruktura
Metode izvođenja nastave:	Predavanja provodi nastavnik tokom kojih se predstavljaju teorijski aspekti uz rješavanje numeričkih problema i praktičnih primjera. Predavanje se odvijaju uz korištenje video i audio zapisa. Vježbe uključuju rješavanje numeričkih i praktičnih problema, a što uključuje i rješavanje problema sa prethodnih ispita s ciljem postizanja boljeg razumijevanja prezentiranih teorijskih tema.
Metode provjere znanja sa strukturom ocjene:	Kriterijum vrednovanja rada i ocjenjivanja studenta u toku nastave, vrši se na sljedeći način: Testovi tokom semestra (ili praktični zadatak) od 0 - 15 bodova; I parcijalni ispit/I test/ I provjera znanja/ od 0 - 35 bodova (uslov 50%). Ukupan broj bodova koji student prema navedenom praćenju u toku nastave može ostvariti iznosi maksimalno 50 bodova. Završni ispit se organizuje iz cjelokupnog pređenog gradiva u toku nastave i iznosi najviše 50 bodova, od čega je II parcijalni ispit od 0 - 25 bodova (uslov 50%) i završni - teorija i zadaci od 0 - 25 bodova, koji traje 60 min (studenti polažu teoriju i zadatke koje nisu radili na parcijalnim ispitima). Na završnom ispitu studenti mogu popravljati I parcijalni ispit, ako to ranije nisu zadovoljili. Isto vrijedi i za ispitni rok popravni završnog ispita i oba termina jesenjeg ispitnog roka. 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 (%) Aktivnost /Mini testovi/Zadaće/Seminarski rad .....15 bodova (%) I Parcijalni ispit/Test/Provjera znanja/.....35 bodova (%) Završni ispit (II Parcijalni + Teorija) .....50 bodova (%)

Literatura:	Obavezna: 1. Blažić, M. R., Opšta statistika - Osnovi i analiza, Savremena administracija, Beograd, 1982. 2. Carnahan, B. , H. A. Luther, H. A. , Wilkes, J. O., Applied Numerical Methods, John Wiley &Sons, 1969. 3. Elezović, N., Teorija vjerojatnosti, zbirka zadataka, Element, Zagreb, 1995. 4. Fatkić, H., Vjerovatnoća i statistika, I . dio, The Soros Foundations, FOD BiH, Sarajevo, 1997; Corons, Sarajevo, 2000. 5. Fatkić, H., Hasković, A., Čolaković, A., Avdagić, E., Primjenjena matematika i statistika, Predavanja i vježbe, Slajdovi i bilješke, Sarajevo, 2012, http://www.fsk.unsa.ba/ 6. Hadžć, O., Numeričke i statističke metode u obradi eksperimentalnih podataka,Institut za matematiku, Novi Sad, 1989. Dopunska: 1. Ivanšić, I., Numerička matematika, Element, Zagreb, 1998. 2. Johnson, R. A. , Bhattacharyya, G. K., Statistics: Principles and Methods, Wiley, New York, 5th edition, 2006. 3. Lučić, B., Statistika, Ekonomski fakultet, Sarajevo, 1996.

Šifra predmeta: 12ATCOS010203	**Naziv predmeta:** SISTEMSKO INŽENJERSTVO		
Ciklus: I	**Godina: II**	**Semestar: III**	**Broj ECTS kredita: 6**
Status: Obavezni predmet		**Ukupan broj sati: 90** Razrada distribucije sati po tipu: Predavanja: 60 Vježbe: 30	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**		
Preduslov za upis:	NE		
Cilj (ciljevi) predmeta:	Cilj predmeta jeste ovladavanje prometnim procesima, kao i utvrđivanje zajedničkih prometnih veličina koje omogućavaju kvalitetnije povezivanje u jedinstvenu prometnu mrežu. Postizanjem adekvatne interakcije između komponenata prometnog sustava kroz njegov životni ciklus bit će dat osvrt na pojedine faze tehnoloških procesa u saobraćaju i komunikacijama.		
Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)*	1. Uvod – pojmovi i definicije 2. Sustavski pristup proučavanja prometa (Struktura prometnog sustava; Sustavsko modeliranje prometa) 3. Temeljni sustavski koncepti (Opće definicije i interpretacije pojma sustav; Klasifikacija sustava) 4. Analogija, homomorfija i izomorfija. Stanje I proctor stanja. Sustavska analiza. Sustavska arhitektura. Životni ciklus sustava. 5. Sustavski dijagrami i pomagala (Objektogram i funkciogram; ER dijagrami; DFD dijagrami; GPSS blok dijagrami; Petrijeva mreža) 6. Ponašanje otvorenih dinamičkih sustava (Vrste ponašanja sustava; Prijelazni procesi; Statička i dinamička karakteristika sustava) 7. Definiranje i razvoj sustava (Primarne faze sustavskog inženjerstva; Definiranje sustavskih zahtjeva)		

	8. Sustav i procesi cestovnog prometa (Sustavsko definiranje cestovnog prometa; Sustavsko dizajniranje cestovne mreže) 9. Tehnologija cestovnog prometa (Sustavski opis tehnologije prevoza putnika i tereta u cestovnom prometu) 10. Sustav i procesi željezničkog prometa (Definiranje i opisivanje sustava željezničkog prometa; Sustavski pristup izboru željezničkih vozila) 11. Sustav i procesi zračnog prometa (Sustavsko definiranje zračnog prometa; Sustavski razvoj mrežne infrastrukture; Tehnologija zračnog prometa) 12. Sustavi i procesi telekomunikacijskog prometa (Sustavsko definiranje tk. Prometa; Sustavski razvoj tk.mreže) 13. Tehnološki procesi Inteligentne mreže 14. Sustav i procesi poštanskog prometa (Sustavsko definiranje poštanskog prometa; Razvoj poštanske mreže i tehnologija; Tehnologija poštanskog prometa) 15. Razvoj inteligentnih transportnih sustava (Koncept i usluge ITS-a; Razvoj ITS-a)
Ishodi učenja:	Znanje:. Studenti kroz nastavni proces predavanja i auditornih vježbi, kao i kroz praktičan rad će ovladati predmetnom tematikom i steći teorijska i praktična znanja iz oblasti sistemskog inženjerstva Vještine: Sposobnost primjene teorijskih i praktičnih znanja iz oblasti sistemskog inženjerstva. Kompetencije: Sposobnosti praćenja tehnoloških procesa, a u cilju stvaranja kvalitetne strukture prometnog sustava koja za rezultat ima kvalitetnu, sigurnu, bez kašnjenja i ekološki prihvatljivu prometnu uslugu.
Ciljevi održivog razvoja (SDGs)	SDG9 – Industrija, inovacije i infrastruktura SDG11 – Održivi gradovi i zajednice SDG12 – Održiva potrošnja i proizvodnja SDG13 – Zaštita klime
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. Čaušević S, Bošnjak I, SUSTAVSKO INŽENJERSTVO U TRANSPORTU I KOMUNIKACIJAMA, Univerzitet u Sarajevu, Fakultet za saobraćaj i komunikacije, Sarajevo, 2006. Dopunska: 1. Bilješke i slajdovi s predavanja i vježbi

Šifra predmeta: 13ATCOS010203	**Naziv predmeta:** EKONOMIKA U SAOBRAĆAJU I KOMUNIKACIJAMA		
Ciklus: I	**Godina: II**	**Semestar: III**	**Broj ECTS kredita: 6**
Status: Obavezni predmet		**Ukupan broj kontakt sati: 90** Opciono razraditi distribuciju sati po tipu: Predavanja :45 Vježbe:30 Seminarski i projektni zadatak:15	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**		
Preduslov za upis:	NE		
Cilj (ciljevi) predmeta:	Sticanje elementarnih znanja iz područja ekonomike u saobraćaju i komunikacijama u funkciji ekonomski efikasnog i kvalitetnog saobraćajno-komunikacijskog sistema.		
Tematske jedinice:	1. Pojam i značaj ekonomike saobraćajno-komunikacijskih modela		

(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)	2. Uloga saobraćaja u društvenoj reprodukciji 3. Karakterstike proizvodnje saobraćajno-komunikacijskih usluga 4. Ponuda i potražnja kao tržišni elementi 5. Oblikovanje i utvrđivanje vrijednosti saobraćajno-komunikacijske usluge 6. Troškovi saobraćajno-komunikacijskog procesa 7. Analiza dinamike troškova 8. Remanentnost troškova i faktori remanentnosti u saobraćaju i komunikacijama 9. Cijene saobraćajno-komunikacijske usluge i faktori od kojih zavise 10. Tarife i tarifska politika 11. Principi ekonomije poslovanja u saobraćaju i komunikacijama 12. Investicije u saobraćaju i komunikacijama 13. Metode vrednovanja investicijskih projekata u SIK 14. Osnovna obilježja poreskog sistema i poreske politike u SIK 15. Faktori relevantni za vođenje ekonomike preduzeća u SIK
Ishodi učenja:	Znanje: Studenti će steći znanja iz područja ekonomike u saobraćaju i komunikacijama u funkciji ekonomski efikasnog i kvalitetnog saobraćajno-komunikacijskog sistema Vještine: Razumijevanje ekonomskih zakonitosti i kvalitativno-kvalitativnih analiza ekonomskih procesa koji se pojavljuju u saobraćajnom preduzeću i saobraćajnom tržištu Kompetencije: Aplikaciju stečenih znanja u konkretnim modelima.
Cilj održivog razvoja (SDG):	SDG 4: Osigurati inkluzivno i kvalitetno obrazovanje, te promovirati mogućnosti cjeloživotnog učenja za sve, SDG 8: Promicati održiv ekonomski rast kroz punu i produktivnu zaposlenost i dostojanstven rad za sve, SDG 9: Industrija, inovacije i infrastruktura - Izgraditi otporniju infrastrukturu, promovirati inkluzivnu i održivu industrializaciju te poticati inovacije, SDG 10: Smanjenje nejednakosti - Smanjiti nejednakosti unutar i među zemljama. SDG 12: Odgovorna potrošnja i proizvodnja - Osigurati održive obrasce potrošnje i proizvodnje.
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 i seminarskih radova. Case Study, Workshop.
Metode provjere znanja sa strukturom ocjene:	Kriterijum vrednovanja rada i ocjenjivanja studenta u toku nastave, vrši se na sljedeći način: Domaća zadaća: od 0 do 5 bodova Seminarski rad / projektni zadatak): od 0 do 10 bodova; I test / I provjera znanja / I parcijalni ispit: od 0 do 35 bodova. Ukupan broj bodova koji studenta može ostvariti u toku nastave može iznosi maksimalno 50 bodova. Završni 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, tj. 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, polaganjem parcijalnog i završnog ispita. Prema kvalitetu stečenih znanja i vještina student može osvojiti maksimalno 100 bodova, a prema sljedećoj skali: Struktura bodovanja Bodovi (%) Domaća zadaća .....5 bodova (%) Seminarski / Projektni zadatak:..... 10 bodova (%) I test / I provjera znanja (I parcijalni ispit):..... 35 bodova (%) Završni (II parcijalni ispit):..... 50 bodova (%) Potreban uslov za uspješno okončan ispit je postignut rezultat od 55 bodova pri čemu na svakom dijelu ispita treba ostvariti minimalno 55% (aktivnost, parcijalni ispit, završni ispit), tj. da bi student položio ispit mora ostvariti sljedeće uslove: - Domaća zadaća:3 boda - Aktivnost (seminarski rad / projektni zadatak): 6 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 ispita polažu kompletno gradivo, pri čemu kriteriji za polaganje ispita ostaje identični. Završni ispit se organizuje kao pismeni i/ili usmeni. Aktivnost se može pratiti kroz izradu zadaće, seminarskih radova, projektnih zadataka ili polaganje kvizova. Napomena: Studenti su obavezni prisustvovati svim oblicima nastave minimalno 80 % od ukupnog fonda sati i prisustvo na nastavi je uslov za ovjeru urednog pohađanja nastave. Student može, u opravdanim slučajevima (bolest) odsustvovati sa nastave, za što je obavezan dostaviti zdrastveno opravdanje. Seminarski rad i domaća zadaća će biti bodovane samo ako budu predane prema definisanim terminima. Naknadne predaje istih neće se bodovati. Konačan uspjeh studenta nakon svih predviđenih oblika provjere znanja, vrednuje se i ocjenjuje sistemom ocjenjivanja kako slijedi: a) 10 - izuzetan uspjeh bez grešaka ili sa neznatnim greškama, nosi 95-100 bodova; b) 9 - iznad prosjeka, sa ponekom greškom, nosi 85-94 bodova; c) 8 - prosječan, sa primjetnim greškama, nosi 75-84 bodova; d) 7 - općenito dobar, ali sa značajnijim nedostacima, nosi 65-74 bodova; e) 6 - zadovoljava minimalne uslove, nosi 55-64 bodova; f) 5 - ne zadovoljava minimalne uslove, manje od 55 bodova.
Literatura:	Obavezna: 1. Azra Ferizović, Aida Kalem, „Ekonomika u saobraćaju i komunikacijama (SKRIPTA I dio)," Fakultet za saobraćaj i komunikacije, Sarajevo, 2020.

	2. Azra Ferizović, Aida Kalem „Ekonomika u saobraćaju i komunikacijama (SKRIPTA II dio)," Fakultet za saobraćaj i komunikacije, Sarajevo, 2020. 3. Čekić, Š., Ekonomika u transportu i komunikacijama, Univerzitet u Sarajevu, Fakultet za saobraćaj i komunikacije, Sarajevo, 2005. 4. Novaković, S., Ekonomija saobraćaja, Beograd, 5. Perić, T., Radačić, Ž., Šimulčik, D., Ekonomika prometnog sustava, Sveučilište u Zagrebu, Fakultet prometnih znanosti, Zagreb, 2000. 6. Perović, D., Teorija troškova, Beograd, 7. Samuelson, P., Nordhaus, D., Ekonomija, Mate, 1992. Dopunska: 1. J. Petrović-Vujačić: Osnovi ekonomije, Saobraćajni fakultet Beograd, 2010. 2. Šunjić-Beus, M. et al. (2009). Ekonomika preduzeća, elektronsko izdanje, Ekonomski fakultet u Sarajevu, Sarajevo 3. Martinović, D. (2013). Tačka pokrića kao instrument poslovnog odlučivanja, Ekonomski fakultet u Sarajevu 4. Thompson, A. Economics of the Firm, theory and practice, fifth Edition, New Jersey 5. Tatić, K. (2008). Menadžerska ekonomija. Ekonomski fakutet u Sarajevu 6. Somun-Kapetnović, R., Arnaut-Berilo, A. Šehić, E & Kahvić, E. (2009). Kvantitativne metode u ekonomiji i menadžmentu, Sarajevo. Ekonomski fakultet u Sarajevu

Šifra predmeta: 14ATCOS010203	**Naziv predmeta:** INFORMACIONI SISTEMI U SAOBRAĆAJU I KOMUNIKACIJAMA		
Ciklus: I	**Godina: II**	**Semestar: III**	**Broj ECTS kredita: 6**
Status: Obavezni predmet		**Ukupan broj sati: 90** Predavanja: 45; Vježbe: 30; Seminar: 15	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**		
Preduslov za upis:	NE		
Cilj (ciljevi) predmeta:	Sticanje znanja o informacijskim sistemima, njihovoj primjeni, komponentama, tehnologijama i principima razvoja, a u cilju osposobljavanja studentata za rješavanje zadataka i problema planiranja, razvoja i analize informacijskih sistema u saobraćaju i komunikacijama.		
Tematske jedinice:	1. Pojam sistema i informacijskih sistema (IS) 2. Infrastruktura i arhitektura informacijskih sistema 3. Informacijske i komunikacijske tehnologije 4. Sistemi za upravljanje bazama podataka 5. Programska rješenja za razvoj IS 6. Komunikacijske tehnologije za razvoj IS 7. Životni ciklus razvoja informacijskih sistema (SDLC) 8. Organizacija razvoja informacijskih sistema 9. Primjena CASE alata za projektovanje IS 10. Planiranje razvoja informacijskih sistema 11. Modeliranje i reinženjering procesa: *Workflow, DFD, BPR*		

	12. Modeliranje strukture, baze podataka i ponašanja IS 13. Implementacija informacijskih sistema 14. Analiza informacijskih sistema 15. Sigurnost i kvalitet informacijskih sistema
Ishodi učenja:	Znanje: Studenti će steći teorijska i praktična znanja o vrstama i komponentama informacijskih sistema, načinu njihovog projektovanja i mogućnostima primjene u saobraćaju i komunikacijama. Vještine: Studenti će ovladati vještinama i alatima koji se koriste kod projektovanja i razvoja informacijskih sistema kao što su CASE alati. Kompetencije: Studenti će biti osposobljeni da učestvuju u planiranju i razvoju informacijskih sistema, a posebno sistema koji su namjenjeni za oblasti saobraćaja i komunikacija.
Ciljevi održivog razvoja (SDG):	SDG9 – Industrija, inovacije i infrastruktura
Metode izvođenja nastave:	Nastava se realizira kroz izvođenje predavanja i vježbi. Predavanja se realizuju kroz usmeno izlaganje sa prezentacijom i prikazom primjera iz prakse. Tokom realizacije nastave se inicira diskusija o problemima planiranja, analize, projektovanja i razvoja informacijskih sistema sa posebnim osvrtom na sisteme koji se primjenjuju u oblasti saobraćaja i komunikacija. U toku nastave se koriste različite metode koje uključuju: usmeno izlaganje, diskusije, demonstracije, individualni i grupni rad.
Metode provjere znanja sa strukturom ocjene:	Ukupan broj bodova koji student može ostvariti u toku nastave je 50 i na završnom ispitu 50. Bodovi u toku nastave su raspoređeni na zadaće i/ili seminar i/ili projektni zadatak i na parcijalni ispit. Završni / popravni ispit uključuje gradivo koje student nije položio na parcijalnom ispitu što znači da obuhvata drugi dio gradiva (koji nije obuhvaćen parcijalnim ispitom) koji se vrednuje sa 50 bodova za studente koji su položili parcijalni ispit ili se sastoji od kompletnog gradiva koje se vrednuje sa 80 bodova za studente koji nisu položili parcijalni ispit. Aktivnost studenta se prati i ocijenjuje kroz učestvovanje u diskusijama na nastavi, izradu zadaća, seminarskih radova, projektnih zadataka ili polaganje kvizova. Završni / popravni ispit se organizuje kao pismeni i/ili usmeni ispit. 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, polaganjem parcijalnog i završnog/popravnog ispita. Prema kvalitetu stečenih znanja i vještina student može osvojiti maksimalno 100 bodova, a prema sljedećoj skali: Struktura bodovanja Bodovi (%) Zadaće / Aktivnost na nastavi:..... 20 bodova (%) I test / I provjera znanja (I parcijalni ispit):..... 30 bodova (%) Završni ili popravni ispit (II parcijalni ispit):..... 50 bodova (%) Potreban uslov za polaganje ispita je 55 bodova u sumi uz ostvarenih najmanje 55% bodova na provjerama znanja (parcijalni ispit i završni/popravni ispit). Konačan uspjeh studenta, nakon svih predviđenih oblika provjere znanja, vrednuje se i ocjenjuje sistemom kako slijedi: a) 10 - izuzetan uspjeh bez grešaka ili sa neznatnim greškama (95-100 bodova); b) 9 - iznad prosjeka, sa ponekom greškom (85-94 bodova); c) 8 - prosječan, sa primjetnim greškama (75-84 bodova); d) 7 - općenito dobar, ali sa

	značajnijim nedostacima (65-74 bodova); e) 6 - zadovoljava minimalne uslove (55-64 bodova); f) 5 - ne zadovoljava minimalne uslove (manje od 55 bodova). Navedena skala ocjenjivanja se može korigovati prema Pravilima studiranja na Univerzitetu u Sarajevu (Član 49).
Literatura:	Obavezna literatura: 1. A. Čolaković, „*Informacioni sistemi u saobraćaju i komunikacijama (SKRIPTA),"* Fakultet za saobraćaj i komunikacije, Sarajevo, 2020. Dopunska literatura: 1. Ralph M. Stair, George W. Reynolds, „*Fundamentals of Information Systems*," Cengage Learning, 2016. 2. Alan Dennis, Barbara Haley Wixom, Roberta M. Roth, „*Systems analysis and design*," Wiley, 2015. 3. Patricia Wallace, „*Introduction to Information Systems*," Pearson Education, 2015. 4. Richard T. Watson (editor), „*Information Systems*," Global Text Project (Creative Commons Attribution 3.0 License), 2017. 5. Arthur M. Langer, „*Analysis and Design of Information Systems, Springer-Verlag*," 2008. 6. John Wang, „*Innovations in Supply Chain Management for Information Systems*," Business Science Reference, 2010. 7. Anita Pickerden, „*Planning and Managing your Work Based Projects*," bookboon.com, 2015. 8. Terra Vanzant Stern, „*Lean and Agile Project Management*," Taylor & Francis Group, 2017. 9. Andrew Stellman & Jennifer Greene, „*Learning Agile*," O'Reilly Media, 2015. 10. Christos Kalloniatis: "*Modern Information Systems*," InTech Croatia, 2012. 11. Poliščuk Jaroslav: „*Projektovanje informacionih sistema*," Podgorica, 2007. 12. Kelly R. Jr, Efraim T.: „*Uvod u informacione sisteme*," Data Status, 2009. 13. Information Security Management Systems (ISMS) standards, ISO/IEC 27000 14. ISO 9000 family of quality management systems (QMS) standards

Šifra predmeta: 15-1ATCES010203	**Naziv predmeta:** ELEMENTI TRANSPORTNIH SREDSTAVA I UREĐAJA		
Ciklus: I	**Godina: II**	**Semestar: III**	**Broj ECTS kredita:** 6
Status: Izborni predmet		**Ukupan broj kontakt sati: 90** Predavanja: 60 Vježbe: 30	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**		
Preduslov za upis:	Ne		

Cilj (ciljevi) predmeta:	Cilj predmeta je da student upozna sa racionalnim konstrukcionim oblicima, principima rada, osnovama proračuna i principima izbora materijala elemenata i uređaja transportnih i pretovarnih sredstava.
Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)*	1. Uvod. Elementi za spajanje. Zavareni, lemljeni, lijepljeni spojevi. Spojevi sa zakovicama. 2. Spojevi sa vijcima. Spojevi sa klinovima. strujanje. Stoksova teorema 3. Elastični spojevi. 4. Elementi za kružno kretanje . Vratilo i osovine. 5. Spojnice. Ležišta. 6. Elementi za prijenos snage. Frikcioni prenosnici. 7. Zupčasti prenosnici. 8. Remeni prenosnici. 9. Karakteristika prenosnika snage i njihova primjena na transpornim i pretovarnim sredstvima. 10. Elementi za provođenje tekućina (tečnosti) i gasova (cijevi, cijevni zatvarači i drugi). 11. Uvod. Prvi glavni zakon termodinamike 12. Kalorična svojstva gasova. Smjese gasova 13. Promjene stanja gasova. Kružni procesi. 14. Drugi glavni zakon termodinmike 15. Toplotne mašine. Kompresori. Motori SUS. Turbine
Ishodi učenja:	Znanje: Poznavanje racinalnih konstrukcionih oblika, principa rada, osnova proračuna i izbora materijala elemenata i uređaja transpornih i pretovarnih sredstava. Vještine: Primjena usvojenih znanja iz navedene oblasti će studentu omogućiti da u toku praktičnog rada maksimalno iskoristi eksploatacione karakteristike elemenata i uređaja koji su ugrađeni u transportna i pretovarna sredstva i izvrši pravilan izbor elemenata.Usvojeno znanja iz ovog predmeta je potrebno za lakše praćenje i razumjevanje drugih stručnih predmeta u nastavku studija. Kompetencije: Kroz nastavni proces predavanja, vježbi i izrade domaćih zadataka student će biti sposoban, na osnovu usvojenog znanja da: – shvati osnovne principe rada kompresora, motora sus i gasnih turbina. – analizira elemente i uređaje koji ulaze u sastav transportnih i pretovarnih sredstava te da izvrši pravilan izbor i zamjenu potrebnih elemenata. – postavi i definiše mehaničko- matematičke modele prenosa snage od pogonskog do radnog dijela transportnih i pretovarnih sistema i izvriši pravilan izbor potrebne opreme i snage pogonskog agregata.
Cilj održivog razvoja (SDG):	SDG12 – Održiva potrošnja i proizvodnja
Metode izvođenja nastave:	– Samostalno izlaganje – Diskusija – Analiza primjera iz prakse (zadaci, seminarski radovi)
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 55 %. – I Parcijalni ispit/test/provjera znanja/35 bodova (%), položen je ako se osvoji preko 55 %. – Završni ispit (II Parcijalni) 50 bodova (%), položeno ako se osvoji preko 55 %. – Završni ispit (Integralni) 85 bodova (%), položeno ako se osvoji preko 55 %. 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: Obaveze studenta Bodovi (%) Prisutnost na predavanjima i vježbama.....80 (%) 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. Perše,S., Višnjić,V.: Strojarstvo u prometu, Fakultet prometnih znanosti, Zagreb, 2000. 2. Decker,K.H.: Elementi strojeva ,Tehnička knjiga, Zagreb, 1975. 3. Vrhovski, D., Nikšić. M.: Osnove strojarstva –zbirka rješenih zadataka, FPZ, Zagreb,1998. Dopunska: 1. Šelmić,R.: Elementi transportnih sredstava i uređaja, Saobraćajni fakultet, Beograd, 2005. 2. Šelmić,R, Mijailović,D., Perišić, D.: Elementi transportnih sredstava i uređaja-Praktikum Saobraćajni fakultet, Beograd, 2006. 3. Šelmić,R.:Tehnička termodinamika, Saobraćajni fakultet, Beograd, 2006.

Šifra predmeta: 15-2ATCES010203	**Naziv predmeta:** INFORMACIJE I KOMUNIKACIJE		
Ciklus: I	**Godina: II**	**Semestar: III**	**Broj ECTS kredita: 6**
Status: Izborni predmet		**Ukupan broj sati: 90** Predavanja: 60 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:	Studenti stiču osnovna teorijska znanja potrebna za izučavanje savremenih digitalnih telekomunikacijskih sistema: osnovna teorijska i djelomično praktična znanja iz oblasti teorije informacija i komunikacija u obimu koji odgovara početnom kursu iz ovih oblasti i osnove informacijskih i IP mreža.		
Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)*	1. Informacija: Slučajni događaji. Definicija informacije, matematička interpretacija, svojstva informacije na sintatičkom, semantičkom i programskom nivou. Sadržaj informacije. Logika, sintaksa i semantika. Formalni sistemi, metode i tehnike. Izvori informacija i vrste. 2. Diskretni izvori informacije: količina informacije, entropija. Svojstva entropije. Entropija kontinualnog izvora. Uslovne entropije, uzajamna količina informacije. Izvori sa memorijom - izvori Markova, ergodični izvori. Entropija izvora Markova, izvori višeg reda. 3. Kodiranje izvora: osnovni pojmovi, prefiksni kodovi, Kraftova nejednakost. Statističko kodiranje. Optimalno statističko kodiranje, kodiranje proširenog izvora. Prvi Shannonov teorem. Shannon-Fano kod, Huffmanov kod. 4. Statistički model kanala: diskretni kanal, osnove zaštitnog kodiranja. Shannonov teorem o kodiranju. 5. Signali: pojam, podjela. Deterministički signali: obrada signala u frekvencijskom domenu. Fourierov red. Fourierova transformacija. 6. Slučajni procesi: Autokorelaciona fukcija. Spektralna gustina snage. Signali šumova. Gaussov šum. 7. Kontinualni kanal: pojam, kontinualni kanal sa aditivnim Gaussovim šumom, kapacitet kanala. 8. Analogno digitalna konverzija: Diskretni prikaz kontinualnog signala. Kvantiziranje po amplitudi. PCM. 9. Specifičnosti prenosa digitalnih signala: model telekomunikacijskog sitema, prenos u osnovnom opsegu učestanosti.. 10. Specifičnosti prenosa digitalnih signala u trensponovanom opsegu učestanosti: linearne digitalne modulacije: ASK. FSK. PSK. QAM. Višestruki pristup. 11. Mreže: Informacijska mreža. Telekomunikacijska mreža. Obilježja mreža. OSI i IP modeli mreža. 12. Internet mreže: IP protokol. Familija protokola TCP/IP. IP adresiranje.		

	13. Internet komunikacije: principi, napredne Internet aplikacije i tehnike komuniciranja, organizacija web-a. 14. Telekomunikacijske mreže: podjela, specifičnosti žičnih i bežičnih mreža. Kvalitet servisa u mrežama QoS. 15. Napredne telekomunikacijske tehnike i višestruki pristup: raširenи spektar, sistemi sa više nosilaca.
Ishodi učenja:	Znanje: osnovna teorijska i djelomično praktična znanja iz oblasti teorije informacija i komunikacija u obimu koji odgovara početnom kursu iz ovih oblasti i osnove informacijskih i IP mreža. Vještine: Sposobnost primjene teorijskih i praktičnih znanja iz oblasti savremenih digitalnih telekomunikacijskih sistema. Kompetencije: Sposobnosti samostalnog analiziranja osnovnih parametara relevantnih za teoriju informacija, dizajniranje i analiziranje sistemske karakteristike diskretnog i kontinualnog kanala, sposobnost korištenja osnovnih analitičkih metode u analizi informacijskih i IP mreža.
Ciljevi održivog razvoja (SDGs)	SDG4 – Kvalitetno obrazovanje SDG5 – Rodna ravnopravnost SDG9 – Industrija, inovacije i infrastruktura SDG17 –Partnerstvom do ciljeva
Metode izvođenja nastave:	Nastava se realizira kroz izvođenje predavanja, vježbi i laboratorijskih vježbi. 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 princip uz prikaz opisnih primjera i rješavanje određenih zadataka. Dodatni primjeri se razmatraju i rješavaju kroz vježbe i laboratorijske vježbe, što omogućava kontinuiran rad i pripremu za samostalno rješavanje problema. Rad na domaćoj zadaći/seminarskom radu/ praktičnom radu ima za cilj razvijanje vještina individualnog i timskog rada, te organizacije i realizacije praktičnog projekta.
Metode provjere znanja sa strukturom ocjene:	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. Zadaća se realizira kroz izradu domaće zadaće i polaganje kvizova ili izradu praktičnog rada Postignuti bodovi na kvizovima i dostavljenoj zadaći nemaju mogućnost popravljanja. 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:	Obavezna: 1. Bilješke i slajdovi s predavanja 2. K. Suruliz i M. Hadžialić, Statistička teorija telekomunika- cija, Elektrotehnički fakultet u Sarajevu, 2009, ISBN 978-9958-629-27-3. 3. B. P. Lathi, Modern Digital and Analog Communication Systems, Oxford University Press, New York 998. Dopunska: 1. V. Sinković, Informacijske mreže, Školska knjiga, Zagreb, 1994. 2. Bažant i dr, Osnovne arhitekture mreža, Element, 2004. 3. M. Schwartz, Telecommunications Network: Protocols, Modelling and Analysis, Adisson-3. Wesley PC, Reading, Massachusetts, 1987. 4. J. F. Kurose, K.W. Ross, Internet and Communication Networks, Mc Graw-Hill, 2003.

Šifra predmeta: 16TRTOS010204	**Naziv predmeta:** CESTOVNA VOZILA		
Ciklus: I	**Godina: II**	**Semestar: IV**	**Broj ECTS kredita: 6**
Status: Obavezni predmet		**Ukupan broj sati: 90**	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**		
Preduslov za upis:	Obavezno je prisustvo i aktivnost na predavanjima i vježbama, te izrada projektnog zadatka.		
Cilj (ciljevi) predmeta:	Ovladavanje znanjem o osnovnim pojmovima koja se odnose na cestovna vozila sa posebnim osvrtom na principe rada, funkciju i konstruktivna rješenja glavnih sistema koji se danas koriste na cestovnim vozilima.		

Tematske jedinice:	OKVIRNI SADRŽAJ PREDMETA 1. Savremena cestovna vozila. Klasifikacija cestovnih vozila. Osnovni sistemi cestovnih vozila. Definicija motora SUI. Kratak historijat motora SUI. 2. Podjela motora. Glavni dijelovi motora. Pomoćni sistemi. 3. Ciklusi motora. Međusobno upoređenje ciklusa. Pogonske karakteristike motora SUI (energetske, ekološke, eksploatacione). 4. Vrste karakteristika. Brzinske karakteristike. Karakteristike opterećenja.Univerzalne karakteristike. 5. Sistem za dobavu goriva kod oto motora. Sagorijevanje kod oto motora. 6. Sistem za dobavu goriva kod dizel motora. Ostvarenje smješe i sagorijevanje kod dizel motora. 7. Osnovni sistemi na motoru. Sistemi prijenosa snage 8. Transmisija 9. Sistem elastičnog oslanjanja. 10. Sistem upravljanja. Osnovni elementi sistema. Podjele sistema 11. Sistem kočenja. Uloga i zadaci sistema. Osnovne karakteristike sistema kočenja. 12. Ostali uređaji na vozilu 13. Propisi za vozila u međunarodnom cestovnom transportu. 14. Ekologija, buka, tehničko-bezbjedonosni efekti, itd 15. ECE propisi aktualni i planovi za budućnost.
Ishodi učenja:	Znanje: Kroz nastavni proces predavanja, vježbi i izrade seminarskog rada student će biti sposoban, na osnovu usvojenog znanja da: Pravilno pristupi izboru optimalnog vozila za određene uslove eksploatacije kako sa aspekta pogonskog motora tako i sa aspekta ostalih sistema koji su ugrađeni na vozilo... Vještine:- koristi tehničku literaturu, priručnike i tabele iz ove oblasti. - Prati i usvaja znanja iz stručnih predmeta koji se odnose na sigurnost cestovnog saobraćaja Kompetencije:- ovladavanjem znanja o osnovnim principima rada i funkcijama sistema na vozilu student stiče kompentecije vezane za postupke tehničkog održavanja, certificiranja i homologacije vozila
Cilj održivog razvoja (SDG):	SDG7 – Pristupačna i čista energija SDG9 – Industrija, inovacije i infrastruktura SDG11 – Održivi gradovi i zajednice SDG12 – Odgovorna potrošnja i proizvodnja SDG13 – Klimatske akcije SDG16 - Mir, pravda i jake institucije SDG17 – Partnerstvo za ciljeve
Metode izvođenja nastave:	1. Predavanja i diskusije: Klasična metoda u kojoj se prenosi teorijsko znanje studentima. 2. Multimedijalna sredstva: Korištenje video materijala, prezentacija, simulacija i interaktivnih alata za bolje razumjevanje gradica. 3. Radionice i vježbe: Aktivno učenje kroz praktične primjere, rad na problemima, primjena teorije na stvarnim situacijama. 4. Projekti i istraživanja: Rad na projektima vezanim za cestovna vozila, npr dizajniranje sigurnosnih sistema. 5. Terenske posjete: Posjete servisima, automehaničarskim radionama, stanicama tehničkih pregleda vozila, laboratorijama za cerificiranje, radionama za homologaciju, saobraćajnim policijama.

	6. Online: Korištenje online platformi, alata, resursa za učenjesa što više razmjena informacija. 7. Studije slučaja: Analiza stvarnih situacija ili problema u vezi sa cestovnim vozilima.
Metode provjere znanja sa strukturom ocjene:	
Literatura:	Obavezna: 1. Mustafić, F. Klisura: CESTOVNA VOZILA, 3.izmjenjeno i dopunjeno izdanje, Institut za privredni inženjering, Zenica, 2021. 2. P. Knor: Projektiranje i konstrukcija motornih vozila – skripta, Mašinski fakultet Sarajevo, Sarajevo 2005. 3. Mahalec, Z. Lulić, D. Kozarac: Motori sa unutarnjim izgaranjem, FSB Zagreb, Zagreb 2010. 4. D.krpan; D.Jeras: Laki motori I, Sveučilište u Zagrebu, 1976. 5. Č. Duboka: Tehnologije održavanja motornih vozila, Mašinski fakultet Beograd, Beograd 1992. 6. Filipović, Dž.Bibić, B .Pikula: Sistemi za dobavu goriva kod dizel motora, Mašinski fakultet Beograd, 2010 Dopunska: 1. Filipović: Motorna vozila, predavanja, Fakultet za saobraćaj i komunikacije, Sarajevo, 2002. 2. F. Klisura: Cestovna vozila, predavanja, Fakultet za saobraćaj i komunikacije, Sarajevo, 2022 i 2023. 3. F. Klisura: Cestovna vozila, vježbe zadaci, Fakultet za saobraćaj i komunikacije, Sarajevo, 2022 i 2023.

Šifra predmeta: 17TRTOS010204	**Naziv predmeta:** TEORIJA SAOBRAĆAJNIH TOKOVA		
Ciklus: I	**Godina: II**	**Semestar: IV**	**Broj ECTS kredita: 6**
Status: Obavezni predmet		**Ukupan broj kontakt sati:** 90 Predavanja 60 Vježbe 30	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**		
Preduslov za upis:	Obavezno je prisustvo i aktivnost na predavanjima i vježbama, te izrada seminarskog rada i zadataka za samostalne vježbe		
Cilj (ciljevi) predmeta:	Nastavna materija koja je obuhvaćena sadržajem, treba da omogući studentima upoznavanje sa osnovama Teorije saobraćajnog toka i sa osnovnim metodama saobraćajno – tehničkog proračuna. Cilj je da se studentima pruži teorijska i stručna osnova za dimenzioniranje saobraćajne infrastrukture, što pretstavlja nezaobilazan segment u saobraćajnom planiranju.		
Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti*	1. Predmet i zadaci teorije saobraćajnog toka Tehnička baza cestovnog saobraćaja 2. Osnovi trasiranja i projektovanja cestovnih saobraćajnica		

organizacionih jedinica)	3. Kretanje pojedinačnog vozila Definisanje parametara saobraćajnog toka 4. Karakteristika saobraćajnih tokova Teorijske relacije između osnovnih parametara saobraćajnog toka. Karakteristične vrijednosti osnovnih parametara saobraćajnog toka. 5. Empirijski modeli međuzavisnosti osnovnih parametara saobraćajnog toka 6. Matematički modeli u opisivanju zakonitosti kretanja vozila u saobraćajnim tokovima na putevima 7. Monitoring i kontrola cestovnih saobraćajnih tokova 8. Pješački tokovi 9. Kapacitivna analiza i dimenzioniranje dijelova saobraćajne mreže pri vladajućim uslovima odvijanja saobraćaja 10. Robni i putnički tokovi na željeznici 11. Pruge i pružna postrojenja, lokomotive, željeznička kola, rad željezničke mreže i definiranje propusne i prijevozne moći željezničke pruge 12. Obrt kola i brzine u željezničkom saobraćaju, rad lokomotiva,obrt lokomotiva, potreban broj lokomotiva, grafikoni saobraćaja vozova. 13. Planiranje kapaciteta u zračnom saobraćaju, eksploatacija zrakoplova, linije zračnog saobraćaja, izvršenje prevoznog procesa, eksploatacija zračnih puteva. 14. Saobraćajni tokovi na aerodromima 15. Modeli za ocjenu potražnje za zračnim prevozom, modeli raspodjele putovanja, multimodalni modeli, frekvencija letenja, vremenski gubici, usaglašavanje prevoznih kapaciteta i putničkih zahtjeva, raspodjela saobraćaja na mrežu.
Ishodi učenja:	Studenti kroz nastavni proces predavanja, vježbe i praktičan rad trebaju steći odgovarajuća znanja i iskustva za praktičnu primjenu u oblasti planiranja saobraćajne infrastrukture i njenog usklađivanja sa potražnjom, odnosno dostignutim i budućim potrebama u različitim vidovima saobraćaja. Predmet Teorija saobraćajnih tokova treba da osigura potreban nivo znanja o pravilima, metodama i postupcima za praćenje i utvrđivanje zakonitosti kretanja vozila u saobraćajnim tokovima.Također predmet omogućava sticanje znanja i vještina neophodnih za praćenje i upravljanje saobraćajnim tokovima sa ciljm edukacije u oblasti usklađivanja postojeće i planirane infrastrukture sa zahtjevima savremenog saobraćaja.
Cilj održivog razvoja (SDG):	SDG 9 - Industrija, inovacije i infrastruktura SDG 11 - Održivi gradovi i zajednice SDG 13 - Klimatske promjene
Metode izvođenja nastave:	Nastava se realizira kroz izvođenje predavanja, vježbi i praktičnog dijela nastave koja uključuje izradu projektnih zadataka. Predavanja se realizuju kroz usmeno izlaganje sa prezentacijom i prikazom primjera iz prakse. Inicira diskusija o problemima u oblasti planiranja i projektovanja saobraćajne infrastrukture. Studenti će biti obavezni izraditi i prezentirati seminarske radove i/ili projektne zadatake. U realizaciji nastave se koriste različite metode koje uključuju: usmeno izlaganje i diskusije, demonstracije primjera, metoda grafičkih i video

	prikaza i potenciranje rada u grupama primjenom odgovarajućih metodoloških pristupa.
Metode provjere znanja sa strukturom ocjene:	Kriterijum vrednovanja rada i ocjenjivanja studenta u toku nastave, vrši se na sljedeći način: Prisustvo nastavi i vježbama će se voditi, prisustvo nastavi obavezno kao uslov za dobivanje potpisa i ovjeru semestra uz max. 20% izostanaka bez opravdanja. Redovno prisustvo se neće dodatno bodovati. Potpis nije uslovljen prisustvom na nastavi. Domaća zadaća/seminarski rad/praktični rad/ od 0 do 15 bodova, a ocijeniti će se samo oni studenti koji su zadovoljili preko 50 % od navedenih obaveza; U toku nastave će se organizovati samo jedna provjera znanja - Parcijalni ispit u 7 ili 8 sedmici nastave sa vrednovanjem od 35 bodova, stim da će se bodovati samo oni studenti koji su položili preko 50 % od navedenog parcijalnog ispita. Završni ispit iznosi maksimalno 50 bodova.
Literatura:	Obavezna: 1. Kuzović Lj.: Teorija saobraćajnog toka, Građevinska knjiga, Beograd, 1987. 2. Kuzović Lj.,Bogdanović V.: Teorija saobraćajnog toka,FTN Izdavaštvo N. Sad, 2010. 3. Kovačević P.: Eksploatacija željeznica, Zavod za novinsko-izdavačku i propagandnu djelatnost JŽ, Beograd, 1986. 4. Kiso Fahrudin., Kiso Fadila: Aerodromi, Fakultet za saobraćaj i komunikacije Sarajevo, 2000. 5. Teodorović D.: Modeli u vazdušnom transportu, Saobraćajni fakultet Beograd, 1988. 6. Kiso F.: Tokovi u željezničkom saobraćaju, Predavanja skripta, 2009. 7. Kiso F.: Tokovi u zračnom saobraćaju, Predavanja skripta, 2012. Dopunska: 1. Mussone L.: Instrumenti za monitoring cestovnih saobraćajnih tokova, Education and Culture TEMPUS , Sarajevo 2004. 2. Highway Capacity Manual 2010, Transportation Research Board, National Research Council, WashingtonD.C.,2010.

Šifra predmeta: 18TRTOS010204	**Naziv predmeta:** MATERIJALI I ROBE U TRANSPORTU		
Ciklus: I	**Godina: II**	**Semestar: IV**	**Broj ECTS kredita: 6**
Status: Obavezni predmet		**Ukupan broj kontakt sati: 90** Predavanja: 60 Vježbe: 30	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**		
Preduslov za upis:	NE		
Cilj (ciljevi) predmeta:	Osnovni cilj predmeta „Materijali i robe u transportu“ je sticanje znanja o tehničko-tehnološkom, ekonomsko-komercijalnom i transportnom aspektu izučavanja nauke o materijalima; klasifikacija, standardizacija i identifikacija proizvoda; Sticanje znanja o novom konceptualnom pristupu kvaliteta materijala, roba i usluga kroz upoznavanje i razradu pojmova;		

	Upoznavanje sa osnovnim karakteristikama materijala za tehniku transporta i materijala koji se pojavljuju kao roba u transportu, sa ciljem očuvanja njihove upotrebne vrijednosti u svim fazama transportnog procesa.
Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)*	1. Uvod. Osnovni pojmovi o materijalima i robama. Transportni aspekt 2. Podjela i klasifikacija materijala, roba i usluga 3. Opći pojmovi o standardizaciji i srodnim djelatnostima (akreditiranje, certificiranje, ispitivanje, mjeriteljstvo, kalibriranje) 4. Kvalitet proizvoda i kontrola kvaliteta. Osnove i principi evropske transportne politike u funkciji kvaliteta 5. Tehničko - tehnološki elementi kvaliteta materijala, roba i usluga 6. Ekonomsko - komercijalni elementi kvaliteta materijala, roba i usluga 7. Metode utvrđivanja kvaliteta materijala i roba 8. Označavanje i identifikacija materijala i roba. Dokumenti za robu u transportu 9. Okrupnjavanje, ambalaža i pakovanje materijala i roba 10. Materijali za tehniku transporta: podjela, osobine, kontrola 11. Metodologija izbora materijala za tehniku transporta 12. Materijali kao roba u transportu-transportujući materijali 13. Podjela i osobine transportujućih roba: opasne materije, rasuti tereti, žive životinje 14. Zvanične kontrole transportujuće robe 15. Zaključna razmatranja
Ishodi učenja:	Znanje: Predmet proučavanja treba da osigura nivo kompetencija i znanja potrebnih za rješavanje konkretnih problema u oblasti transporta roba i materijala. Teorijska i praktična znanja iz oblasti materijala i roba u transportu. Također, predviđeni program treba da ukaže na naučni pristup problemima transporta različitih materijala i roba. Vještine: Razvijene sposobnosti primjene teorijskih i praktičnih znanja iz oblasti ponašanja roba i materijala u transportu. Kompetencije**:** Razvijene sposobnosti samostalnog razumijevanja i korištenja znanja potrebnih za rješavanje specifičnih problema u oblasti ponašanja roba i materijala u transportu.
Cilj održivog razvoja (SDG):	SDG 8: Dostojanstven rad i ekonomski rast - Promovisati održivi, uključivi i održivi ekonomski rast, zapošljavanje i dostojanstven rad za sve; SDG 9: Industrija, inovacije i infrastruktura - Izgraditi otpornu infrastrukturu, promovirati uključivu i održivu industrializaciju i poticati inovacije; SDG 12: Odgovorna potrošnja i proizvodnja - Osigurati održive obrasce potrošnje i proizvodnje.
Metode izvođenja nastave:	Nastava se realizira kroz usmeno iznošenje sa prezentacijom (ex katedra) i prikazom različitih procesa iz oblasti ponašanja roba i materijala u tranasportu uz korištenje video i audio zapisa, te samostalno izlaganje pojedinih konkretnih problema u oblasti identifikacije proizvoda. Iniciranje rasprava i diskusija sa studentima o problemima iz prakse, pojedinačnih zapažanja iz različitih okruženja,

	izrada samostalnih istraživanja i analiza iz oblasti ponašanja roba i materijala u transportu.
Metode provjere znanja sa strukturom ocjene:	Kriterijum praćenja rada i ocjenjivanja studenta u toku nastave i to prema sljedećem načinu: 1. Domaća zadaća/seminarski rad/praktični rad/ max 15 bodova (%), položeno ako se osvoji preko 50 % 2. I Parcijalni ispit/test/provjera znanja / max 35 bodova (%), položen je ako se osvoji preko 50 % 3. Završni ispit - pismeni 20 bodova 4. Završni ispit - usmeni 30 bodova 5. Završni ispit (Integralni) - pismeni - 40 bodova 6. Završni ispit (Integralni) - Usmeni - 45 bodova Da bi student položio ispit mora položiti usmeni dio ispita. 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: Obaveze studenta _____bodovi Prisutnost na predavanjima i vježbama - obavezno se vodi evidencija. Prisustvo nastavi i vježbama se ne boduje. Zadaća/Seminarski/Praksa/.....max 15 bodova I Parcijalni ispit/Test/Provjera znanja/..... max 35 bodova Završni ispit - pismeni ..... max 20 bodova Završni ispit - usmeni ..... max 30 bodova Završni ispit (Integralni) - pismeni..... max 40 bodova Završni ispit (Integralni) - usmeni..... max 45 bodova Završni ispit se organizuje na način da studenti koji su položili prvu provjeru znanja polažu samo završni dio ispita (II dio gradiva), dok studenti koji nisu položili prvu provjeru znanja zajedno sa završnim polažu i prvi parcijalni ispit (I dio gradiva). Ispit se polaže pismeno i usmeno.

	Navedena skala se usvaja prema Pravilima studiranja na Univerzitetu u Sarajevu. Napomena: Studenti su obavezni prisustvovati svim oblicima nastave minimalno 80 % od ukupnog fonda sati. Student može, u opravdanim slučajevima (bolest) odsustvovati sa nastave, za što je obavezan dostaviti zdravstveno opravdanje. Seminarski rad i domaća zadaća će biti bodovane samo ako budu predane prema definisanim terminima. Naknadne predaje istih neće se bodovati.
Literatura:	Obavezna: 1. Bilješke i slajdovi s predavanja (moći će se preuzeti na WEB site-u Fakulteta). 2. BERKOVIĆ, M.: skripta predavanja, „Materijali i robe u transportu, Univerzitet u Sarajevu - Fakultet za saobraćaj i komunikacije, 2024. godine. 3. BEHMEN, A., SALIHOVIĆ, S., Materijali i robe u transportu, Knjiga I - klasifikacija, standardizacija, identifikacija, Fakultet za saobraćaj i komunikacije Sarajevo, 2007. 4. BEHMEN, A., SALIHOVIĆ, S., Materijali i robe u transportu, Knjiga II – kvalitet: osnove, principi, kontrola, Fakultet za saobraćaj i komunikacije Sarajevo, 2008. 5. ŠPAGNUT, D., Tehnološke osobine roba u transportu, Saobraćajni fakultet, Beograd, 1989. 6. DŽANIĆ, H., Tehnologija materijala u prometu, Fakultet prometne znanosti, Zagreb, 1989. 7. DŽANIĆ, H., Tehnologija materijala za prometnu tehniku, Fakultet prometne znanosti, Zagreb, 1995. 8. ŠTRUMBERGER, N., Tehnologija materijala, Fakultet prometne znanosti, Zagreb, 1996. 9. Međunarodni/evropski Pravilnici o prijevozu opasnih materija:RID, ADR, IATA, IMDG, AND 10. BAS/EN/ISO/IEC standardi Dopunska: 1. Grupa autora: TRANSPORT OPASNIH MATERIJA, Univerzitet u Sarajevu Fakultet za saobraćaj i komunikacije, 2023.

Šifra predmeta: 19-20-1TRTES010204	**Naziv predmeta:** LOGISTIČKI SISTEMI		
Ciklus: I	**Godina: II**	**Semestar: IV**	**Broj ECTS kredita: 6**
Status: Izborni predmet		**Ukupan broj kontakt sati: 90** Predavanja: 45 Vježbe: 30 Seminarski/projektni zadatak: 15	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**		
Preduslov za upis:	NE		
Cilj (ciljevi) predmeta:	Osnovni cilj izbornog predmeta „Logistički sistemi“ je sticanje i ovladavanje osnovnim teoretskim znanjima o logističkim sistemima u saobraćaju i transportu, te primjena tih znanja na vježbama i izradi		

	samostalnih seminarskih radova; Sticanje znanja o ulozi i funkciji logističkih sistema u modernoj ekonomiji te razrada tehničkih pojmova; Upoznavanje sa osnovnim karakteristikama logističkih sistema u fazama planiranja, provedbe i kontrole efikasnih tokova i skladištenja roba, usluga i povezanih informacija od mjesta porijekla do tačke potrošnje kako bi se zadovoljili zahtjevi kupaca.
Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)*	1. Uvod u „logističke sisteme“. Pojam, struktura i misija logističkog sistema, trendovi 2. Osnovni koncept logistike i distribucije, struktura opšteg i univerzalnog logističkog sistema 3. Robni i informacijski tokovi logističkog lanca. Kanali distribucije, Operacije i upravljanje lancem opskrbe 4. Osnovne karakteristike i funkcije logističkih sustava Modaliteti upravljanja robnim tokovima u logističkim sistemima 5. Logističke mreže. Funkcijski (pod) sistemi logističkog sistema 6. Skladišta u logističkoj mreži. Skladišno logistički sistemi. Pojam i misija skladišne logistike 7. Pojam, funkcija i misija informacijsko logističkog sistema 8. Pojam saobraćajno logistički sistemi, struktura, misija i upravljanje saobraćajno logističkim sistemima 9. Manipulacijsko logistički sistemi. Upravljanje zalihama. Kontrola logističkog sistema 10. Skladišni infomacijski sistemi i upravljanje skladišno logističkim sistemima 11. Pojam i značaj distribucijsko logističkih sistema. Projektiranje distribucijskog sistema 12. Analiza logističkog sistema. Fizički internet. Struktura, misija i upravljanje logističko distribucijskim sistemima 13. Pojam, obilježje, struktura i misija obrazovno logističkih sistema 14. Sistemi logističko poslovnih usluga. Sistemi pravnih, računovodstvenih, tržišnih i ostalih poslovnih djelatnosti logistike 15. Zaključna razmatranja
Ishodi učenja:	Znanje: Studenti kroz nastavni proces predavanja, vježbe, seminarski rad i praktičan rad trebaju steći odgovarajuća znanja i iskustva u oblasti logističkih sistema. Predmet proučavanja treba da osigura kritičan nivo kompetencija i znanja potrebnih za rješavanje konkretnih problema u oblasti logističkih sistema. Također, predviđeni program treba da ukaže na naučni pristup problemima logističkih sistema; Vještine: Razvijene sposobnosti primjene teorijskih i praktičnih znanja iz oblasti logističkih sistema; Kompetencije: Razvijene sposobnosti samostalnog razumijevanja i korištenja znanja potrebnih za rješavanje specifičnih problema u oblasti logističkih sistema.
Cilj održivog razvoja (SDG):	SDG 8 - Dostojanstven rad i ekonomski rast SDG 9 - Industrija, inovacije i infrastruktura SDG 12 - Odgovorna potrošnja i proizvodnja
Metode izvođenja nastave:	Nastava se realizira kroz izvođenje predavanja i vježbi. Predavanja se realizuju kroz usmeno izlaganje sa prezentacijom (ex katedra) i

	prikazom primjera. Inicira diskusija o problemima upravljanja i organizacije logističkim sistemima. Studenti će biti obavezni izraditi i prezentirati seminarske radove. U realizaciji nastave se koriste različite metode koje uključuju: usmeno izlaganje i diskusije, demonstracije primjera, metoda video prikaza i potenciranje samostalnog rada primjenom odgovarajućih metodoloških pristupa.
Metode provjere znanja sa strukturom ocjene:	Kriterijum praćenja rada i ocjenjivanja studenta u toku nastave i to prema sljedećem načinu: 1. Domaća zadaća/seminarski rad/praktični rad/ max 15 bodova (%), položeno ako se osvoji preko 50 %. 2. I Parcijalni ispit/test/provjera znanja / max 35 bodova (%), položen je ako se osvoji preko 50 %. 3. Završni ispit - pismeni 20 bodova 4. Završni ispit - usmeni 30 bodova 5. Završni ispit (Integralni) - pismeni - 40 bodova 6. Završni ispit (Integralni) - Usmeni - 45 bodova Da bi student položio ispit mora položiti usmeni dio ispita. 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: Obaveze studenta _____bodovi Prisutnost na predavanjima i vježbama - obavezno se vodi evidencija. Prisustvo nastavi i vježbama se ne boduje. Zadaća/Seminarski/Praksa/.....max 15 bodova I Parcijalni ispit/Test/Provjera znanja/.....max 35 bodova Završni ispit - pismeni .....max 20 bodova Završni ispit - usmeni .....max 30 bodova Završni ispit (Integralni) - pismeni.....max 40 bodova Završni ispit (Integralni) - usmeni.....max 45 bodova

	Završni ispit se organizuje na način da studenti koji su položili prvu provjeru znanja polažu samo završni dio ispita (II dio gradiva), dok studenti koji nisu položili prvu provjeru znanja zajedno sa završnim polažu i prvi parcijalni ispit (I dio gradiva). Ispit se polaže pismeno i usmeno. Navedena skala se usvaja prema Pravilima studiranja na Univerzitetu u Sarajevu. Napomena: Studenti su obavezni prisustvovati svim oblicima nastave minimalno 80 % od ukupnog fonda sati. Student može, u opravdanim slučajevima (bolest) odsustvovati sa nastave, za što je obavezan dostaviti zdrastveno opravdanje. Seminarski rad i domaća zadaća će biti bodovane samo ako budu predane prema definisanim terminima. Naknadne predaje istih neće se bodovati.
Literatura:	Obavezna: 1. Bilješke i slajdovi s predavanja (moći će se preuzeti na WEB site-u Fakulteta). 2. Berković, M.: skripta predavanja, „Logistički sistemi, Fakultet za saobraćaj i komunikacije, 2024. godine, 3. Berković, M.: skripta predavanja, „Logistika u saobraćaju i komunikacijama, Fakultet za saobraćaj i komunikacije, 2024. godine. Dopunska: 1. Perišić, R., Sistem kvaliteta usluga, logistika i informatika, Institut tehničkih nauka SANU, Beograd, 2002. 2. Zelenika, R., Prometni sustavi, Tehnologija-organizacija-ekonomika-logistika-menadžment, Sveučilište u Rijeci 2001. 3. Zelenika, R., Temelji logističke špedicije, Knjiga prva, Sveučilište u Rijeci 2005.

Šifra predmeta: 19-20-2TRTES010204	**Naziv predmeta:** ŠPEDITERSKO POSLOVANJE		
Ciklus: I	**Godina: II**	**Semestar: IV**	**Broj ECTS kredita: 6**
Status: Izborni predmet		**Ukupan broj kontakt sati: 90** Predavanja: 45 Vježbe: 30 Seminarski i projektni zadatak: 15	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**		
Preduslov za upis:	NE		
Cilj (ciljevi) predmeta:	Sticanje potrebnih znanja iz oblasti špedicije u funkciji usvajanja osnovnih postupaka, tehnika i procedura za organizaciju vanjskotrgovinskog prometa i robnih transportnih tokova		
Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)*	1. Osnovne značajke špedicije i špeditera 2. Funkcije špedicije u vanjskotrgovinskom prometu 3. Vrste špedicije 4. Međunarodna špedicija kao sistem 5. Stručne organizacije za međunarodnu špediciju		

	6. FIATA dokumenta 7. Osnovni poslovi međunarodnog špeditera 8. Instradacija 9. Pravni položaj špeditera u carinskom postupku 10. Transportno osiguranje 11. Specijalni poslovi međunarodnog špeditera 12. Pravni položaj špeditera u svijetu i BiH 13. Obaveze, prava i odgovornosti špeditera iz ugovora o špediciji 14. Incoterms termini 15. Uloga špeditera u primjeni Incoterms-a
Ishodi učenja:	Znanje: Studenti kroz nastavni proces predavanja, vježbe i praktičan rad stiču odgovarajuća znanja i iskustva za praktičnu primjenu u oblasti vanjskotrgovinskog prometa i špediterskog poslovanja. Vještine: Aplikacijom stečenih znanja, student će biti osposobljen za oblikuje, organizira i realizira međunarodne robne tokove i obavlja sve zadatke iz područja logističke špedicije. Kompetencije: Aplikaciju stečenih znanja u konkretnim modelima
Cilj održivog razvoja (SDG):	SDG 4 - Kvalitetno obrazovanje SDG 9 - Industrija, inovacije i infrastruktura SDG 12 - Odgovorna potrošnja i proizvodnja
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 i seminarskih radova. Case Study, Workshop.
Metode provjere znanja sa strukturom ocjene:	Kriterijum vrednovanja rada i ocjenjivanja studenta u toku nastave, vrši se na sljedeći način: Domaća zadaća: od 0 do 5 bodova, položeno ako se osvoji preko 50% Seminarski rad / projektni zadatak: od 0 do 10 bodova, položeno ako se osvoji preko 50% I test / I provjera znanja / I parcijalni ispit: od 0 do 35 bodova, položeno ako se osvoji preko 50% Završni ispit – pismeni 20 bodova Završni ispit – usmeni 30 bodova Završni ispit (Inegralni) – pismeni - 40 bodova Završni ispit (Inegralni) – usmeni – 45 bodova Da bi student položio ispit mora položiti usmeni dio ispita. Ukupan broj bodova koji studenta može ostvariti u toku nastave može iznosi maksimalno 50 bodova. Završni 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, tj. 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, polaganjem parcijalnog i završnog ispita. Prema kvalitetu stečenih znanja i vještina student može osvojiti maksimalno 100 bodova, a prema sljedećoj skali:

	Struktura bodovanja Bodovi (%) Domaća zadaća:.....5 bodova (%) Seminarski / Projektni zadatak:..... 10 bodova (%) I test / I provjera znanja (I parcijalni ispit):.....35 bodova (%) Završni (II parcijalni ispit):.....50 bodova (%) Potreban uslov za uspješno okončan ispit je postignut rezultat od 55 bodova pri čemu na svakom dijelu ispita treba ostvariti minimalno 50% (aktivnost, parcijalni ispit, završni ispit-pismeni), tj. da bi student položio ispit mora ostvariti sljedeće uslove: - Aktivnost (domaća zadaća): 2,5 bodova - Aktivnost (seminarski rad / projektni zadatak): 5 bodova - I test / I provjera znanja / parcijalni ispit: 17,5 bodova - Završni ispit (II parcijalni ispit) – pismeni dio: 10 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 ispita polažu kompletno gradivo, pri čemu kriteriji za polaganje ispita ostaje identični. Završni ispit se organizuje kao pismeni i/ili usmeni. Aktivnost se može pratiti kroz izradu zadaće, seminarskih radova, projektnih zadataka ili polaganje kvizova. Napomena: Studenti su obavezni prisustvovati svim oblicima nastave minimalno 80 % od ukupnog fonda sati i prisustvo na nastavi je uslov za ovjeru urednog pohađanja nastave. Student može, u opravdanim slučajevima (bolest) odsustvovati sa nastave, za što je obavezan dostaviti zdrastveno opravdanje. Seminarski rad i domaća zadaća će biti bodovane samo ako budu predane prema definisanim terminima. Naknadne predaje istih neće se bodovati. Konačan uspjeh studenta nakon svih predviđenih oblika provjere znanja, vrednuje se i ocjenjuje sistemom ocjenjivanja kako slijedi: a) 10 - izuzetan uspjeh bez grešaka ili sa neznatnim greškama, nosi 95-100 bodova; b) 9 - iznad prosjeka, sa ponekom greškom, nosi 85-94 bodova; c) 8 - prosječan, sa primjetnim greškama, nosi 75-84 bodova; d) 7 - općenito dobar, ali sa značajnijim nedostacima, nosi 65-74 bodova; e) 6 - zadovoljava minimalne uslove, nosi 55-64 bodova; f) 5 - ne zadovoljava minimalne uslove, manje od 55 bodova
Literatura:	Obavezna: 1. Zelenika, R., Međunarodna špedicija, Ekonomski fakultet, Rijeka, 1996. 2. Zelenika, R., Temelji logističke špedicije, Ekonomski fakultet, Rijeka, 2005. 3. F.Jašarević, V.Peulić, Logistika i špedicija, Banja Luka 2005. Dopunska: 1. Ivaković, Č., Stanković, R., Šafran, M., Špedicija i logistički procesi, Fakultet prometnih znanosti, Zagreb, 2010. 2. Kilibarda,M.J., Špedicija i agencijsko poslovanje, Saobraćajni fakultet Beograd, 2009. 3. Mađarić, J., Međunarodna špedicija, Fakultet promrtnih znanosti,

	Zgreb, 1991. 4. M.Kilibarda, M.Andrejić, V. Pajić , Špedicija i međunarodna logistika, Beograd 2022 5. M.Kilibarda, M.Andrejić, V. Pajić, Praktikum iz špedicije

Šifra predmeta: 19-20-3TRTES010204	**Naziv predmeta:** VERTIKALNI TRANSPORT		
Ciklus: I	**Godina: II**	**Semestar: IV**	**Broj ECTS kredita: 6**
Status: Izborni predmet		**Ukupan broj sati: 90** Predavanja: 45 Vježbe: 30 Seminarki: 15	

Učesnici u nastavi:	Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet
Preduslov za upis:	Ne
Cilj (ciljevi) predmeta:	Sticanje edukacijskih oblika u realizaciji programa iz oblasti izbora, upravljanja i modernizacije vertikalnog transporta.
Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)*	1. Vrste uređaja vertikalnog transporta 2. Podjela liftova 3. Liftovi sa vučom čeličnom užadi 4. Sporohodni, brzohodni i ekspres liftovi 5. Teretni liftovi 6. Fasadni liftovi 7. Hidraulični liftovi 8. Pogon hidrauličkih liftova 9. Proračun hidrauličkih liftova 10. Pokretne stepenice 11. Žičare 12. Platforme 13. Održavanje, servisiranje i atestiranje liftova 14. Modernizacija liftova 15. Evropske direktive o liftovima
Ishodi učenja: (Znanje; vještine; kompetencije)	Studenti kroz nastavni proces predavanja, vježbe, i praktičan rad trebaju steći odgovarajuća znanja i iskustva za praktičnu primjenu u oblasti projektovanja, izbora, upravljanja i održavanja sredstava vertikalnog transporta.
Cilj održivog razvoja (SDG):	SDG7 - Pouzdana, održiva i suvremena energija po pristupačnim cijenama za sve SDG9 - Izdržljiva infrastruktura, uključiva i održiva industrijalizacija i inovativnost SDG11 – Inkluzivni, sigurni, prilagodljivi i održivi gradovi
Metode izvođenja nastave:	Predavanja, vježbe i izrada seminarskog rada sa praktičnim osvrtom.
Metode provjere znanja sa strukturom ocjene:	Kriterijum vrednovanja rada i ocjenjivanja studenta u toku nastave, vrši se na sljedeći način: Prisustvo nastavi i vježbama od 0 – 10 bodova (%); Domaća zadaća/seminarski rad/praktični rad/ od 0 do 10 bodova (%); I parcijalni ispit/I test/ I provjera znanja/ od 0 do 15 bodova (%); II parcijalni ispit/II test/ II provjera znanja / od 0 do 20 bodova (%). Ukupan broj bodova (%) koji studenta prema navedenom praćenju u

	toku nastave može ostvariti iznosi maksimalno 55 bodova (%). Završni ispit iznosi najviše 45 bodova odnosno 45 (%). Završni ispit se organizuje iz cjelokupnog pređenog gradiva u toku nastave.
Literatura:	Obavezna: 1. Šelendić B., Vertikalni, kosi i horizontalni transport, Delta pres, Beograd 1973. 2. Strakosch G., Vertical transportation, New Jersey, 2010. Dopunska: 1. Evropske norme EN 81, EN 115. 2. Naredbe i Pravilnici o liftovima

Šifra predmeta: 21TRTOS010305	**Naziv predmeta:** TEHNOLOGIJSKI MARKETING		
Ciklus: I	**Godina: III**	**Semestar: V**	**Broj ECTS kredita: 6**
Status: Obavezni predmet		**Ukupan broj sati: 90**	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**		
Preduslov za upis:	Ne		
Cilj (ciljevi) predmeta:	Studenti kroz nastavni proces predavanja, vježbe, laboratorijske vježbe i praktičan rad trebaju steći odgovarajuća znanja i iskustva za praktičnu primjenu u oblasti tehnologijskog marketinga.		
Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)*	1. Saobraćaj kao oblast materijalne proizvodnje, pojmovno shvatanje saobraćaja. 2. Društvena podjela rada na transportnom tržištu. Marketing kao koncepcijska osnova tržišnog poslovanja. 3. Pojam, definicija i razvoj marketinga. Uloga i značenje marketinga u tržišnom poslovanju i formiranju poslovne politike saobraćajnih preduzeća, tehnologijski marketing. 4. Osnovni elementi marketing mixa u saobraćajnim preduzećima, dodatni instrumentarij tehnologijskog marketinga. 5. Karakteristike saobraćajnog tržišta kao osnove za formiranje poslovne politike saobraćajnih procesa. 6. Organizacija i metode utvrdivanja tržišnih elemenata za planiranje poslovne politike. Metode prognoziranja i planiranja poslovne politike saobraćajnih preduzeća. 7. Organizacija funkcije marketinga u saobraćajnim preduzećima. 8. Troškovi i cijene kao instrument marketing poslovne politike saobraćajnih preduzeća. 9. Odabir i upravljanje kanalima marketing funkcije u saobraćaju. 10. Upravljanje uslužnim poslovima i dodatnim uslugama. 11. Kreiranje strategije komunikacijskog i promocijskog marketinga. 12. Kreiranje programa direktnog marketinga u prometnim sistemima. Planiranje marketing funkcije u saobraćajnim preduzećima. 13. Organizacija i primjena marketing funkcije u saobraćajnim preduzećima. 14. Ocjenjivanje i kontrola izvršenja marketing funkcije u saobraćaju. 15. Razvijanje, testiranje i lansiranje novih usluga u saobraćaju.		

Ishodi učenja:	Znanje: Teorijska i praktična znanja iz oblasti tehnologijskog marketinga u saobraćaju. 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 tehnologijskog marketinga u saobraćaju. Kompetencije: Sposobnosti samostalnog razumijevanja i korištenja znanja potrebnih za rješavanje specifičnih problema u oblasti tehnologijskog marketinga u saobraćaju.
Cilj održivog razvoja (SDG):	SDG4 – „Osigurati uključivo i kvalitetno obrazovanje te promovirati mogućnosti cjeloživotnog učenja“; SDG5 – “Postići rodnu ravnopravnost i osnažiti sve žene i djevojke”; SDG8 – “Promovirati uključiv i održiv gospodarski rast, punu zaposlenost i dostojanstven rad za sve”; SDG9 – “Izgraditi prilagodljivu infrastrukturu, promovirati uključivu i održivu industrijalizaciju i poticati inovativnost”; SDG10 – ”Smanjiti nejednakost unutar i između država”; SDG11 - „Učiniti gradove i naselja uključivim, sigurnim, prilagodljivim i održivim“.
Metode izvođenja nastave:	Nastava se realizira kroz izvođenje predavanja, vježbi, laboratorijskih vježbi/terenskog rada/prakse/izrade workshopova. 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/worshopu 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: 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. Š. Čekić, I. Bošnjak : Tehnologijski marketing u transportu i komunikacijama, Univerzitet u Sarajevu, Fakultet za saobraćaj i komunikacije, Sarajevo, 2011. 2. I. Bošnjak: Tehnologijski marketing, Fakultet prometnih znanosti, Zagreb, 1996. 3. P.Kotler: Upravljanje marketingom, Zagreb,2006. 4. B.Tihi : Istraživanje marketinga,Sarajevo,2007. 5. Š. Čekić, I. Bošnjak: Menadžment u transportu i komunikacijama, Fakultet za saobraćaj i komunikacije- Fakultet prometnih znanosti, Sarajevo-Zagreb, 2000. 6. Grupa autora- B.Tihi: Osnovi marketinga, Sarajevo,1999.

Šifra predmeta: 22TRTOS010305	**Naziv predmeta:** INTELIGENTNI TRANSPORTNI SISTEMI		
Ciklus: I	**Godina: III**	**Semestar: V**	**Broj ECTS kredita: 6**
Status: Obavezni predmet		**Ukupan broj kontakt sati: 90** Predavanja 45 Vježbe 30 Seminar 15	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**]		
Preduslov za upis:	Ne.		
Cilj (ciljevi) predmeta:	Sticanje znanja i vještina potrebnih u realizaciji programa iz područja inteligentnih transportnih sustava, analiza učinka ITS funkcionalnosti na promjene parametara stanja klasičnog prometnog sustava. Korištenje ITS funkcionlanosti u upravljanju prometnim procesima.		

Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)*	1. 1.Definiranje osnovnih pojmova i uloge ITS-a 2. Znanstveno-tehnološki okvir razvoja ITS-a 3. Umjetna inteligencija u sustvu ITS-a 4. Mjerenje učinka i koristi ITS-a 5. Arhitektura ITS-a 6. Europska arhitektura ITS-a 7. Inteligentna vozila 8. Itteligentna transportna infrastruktura 9. Inteligentni terminali 10. Inteligentni teret i transportna oprema 11. Standardizacija Funkcionalnih područja ITS-a 12. Komunikacijske tehnologije u sustavu ITS-a 13. Digitalizacija transporta 14. Planiranje i upravljanje razvojem sustav ITS-a 15. Sigurnost i zaštita sustava ITS-a
Ishodi učenja:	Znanje: Predmet Inteligentni transportni sustavi treba osigurati potreban nivo znanja o tehnologijama, funkcijama i učnicima ITS-a, metodama njihovog planiranja, razvoja i implementacije. Vještine: Predmet ITS omogućava stjecanje vještina neophodnih za mjerenje, analizu i procjenu učinkovitosti, sigurnosti, utjecaja na okoliš i ekonomskih koristi od implementacije sevisa ITS-a. Kompetencije: Studenti kroz nastavni proces predavanja, vježbe, i seminarski rad trebaju steći odgovarajuće kompetencije za dizajniranje, razvoj i upravljanje inteligentnim transportnim sustavima.
Cilj održivog razvoja (SDG):	SDG3 – Zdravlje i blagostanje SDG9 - Industrija, inovacije i infrastruktura SDG11 - Održivi gradovi i zajednice SDG 13 - Zaštita klime
Metode izvođenja nastave:	Predavanja, vježbe i seminarski rad.
Metode provjere znanja sa strukturom ocjene:	1. Prisustvo na na nastavi i semiraski rad 15 bodova 2. Prva provjera znanja 35 bodova 3. Završna provjera znanja 50 bodova
Literatura:	Obavezna: 1. Ezgeta,D.: Inteligentni transportni sustavi, Fakultet za saobraćaj i komunikacije univerziteta u Sarajevu, Sarajevo, 2018. 2. Bošnjak, I. : Inteligentni transportni sustavi, Sveučilište u Zagrebu, Fakultet prometnih znanosti , Zagreb, 2006. Dopunska: 1. Ghosh, S., Lee, T.: Inteligent Transportation Systems- New Principels and Architectures, CRC Press, London, 2000. 2. Miles, J. Chen, K.: ITS Handbook, 2nd edition, PIRAC, 2004. 3. Meng Lu:Evaluation of Intelligent Road Transport Systems – Methods and Results. Institution of Engineering and Technology, London.2016. 4. Meneguette , R.I., De Grande, R., Loureiro ,A. F.: Intelligent Transport System in Smart Cities, Springer, Ontario, 2018. 5. Sładkowski , A.: Wiesław Pamuła:Intelligent Transportation Systems – Problems and Perspectives, Springer, Katowice, 2016. 6. Perallos , A.:Intelligent transport systems – technologies and

	applications. Wiley & Sons, Bilbao,2016. 7. Chow, Y.J.:Informed urban transport systems, Elsever, Amaterdam, 2018. 8. 8. Dimitrakopoulos , G., Uden,L.: The Future of Intelligent Transport Systems, Elsever, Amaterdam, 2020.

Šifra predmeta: 23TRTOS010305	**Naziv predmeta:** INFRASTRUKTURA CESTOVNOG SAOBRAĆAJA		
Ciklus: I	**Godina: III**	**Semestar: V**	**Broj ECTS kredita: 6**
Status: Obavezni predmet		**Ukupan broj sati: 90** Predavanja: 45 Vježbe: 30 Praktične vježbe: 15	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**		
Preduslov za upis:	NE		
Cilj (ciljevi) predmeta:	Sticanje edukacijskih i praktičnih znanja iz oblasti cestovne infrastrukture, kroz nastavni proces predavanja, vježbi i izrade praktičnog rada, sa ciljem osiguranja potrebnog nivoa znanja o projektovanju, izgradnji, održavanju i upravljanju infrastrukture cestovnog saobraćaja.		
Tematske jedinice:	1. Osnove infrastrukture cestovnog saobraćaja 2. Cestovna mreža Bosne i Hercegovine 3. Eksploatacijske karakteristike ceste 4. Djelovanje vozila na cestu 5. Elementi poprečnog presjeka ceste 6. Trasiranje i projektovanje ceste 7. Gornji i donji ustroj ceste 8. Odvodnja cesta 9. Gradska ulična mreža 10. Cestovna čvorišta u nivou i više nivoa 11. Propusna moć cestovnih čvorišta 12. Prateći objekti na cestama i autocestama 13. Održavanje cesta 14. Saobraćajno–ekonomski značaj izgradnje cesta i 15. Regulator i modeli upravljanja cestovnom infrastrukturom		
Ishodi učenja:	Znanje: Teorijska i praktična znanja iz oblasti cestovne infrastrukture. Osnovni propisi, standardi, pravila, metode i postupci u oblasti cestovne infrastrukture. Vještine: Sposobnost primjene teorijskih i praktičnih znanja iz oblasti infrastrukture cestovnog saobraćaja u funkciji uspostave efikasne, efektivne i ekološki prihvatljive cestovne infrastrukture, uz primjenu softverskih alata. Kompetencije: Sposobnosti samostalnog razumijevanja i korištenja propisa, standarda, stručne literature, primjene metoda i postupaka, mjerenja i istraživanja, izrada analiza, procjena i praktičnih rješenja u funkciji daljeg poboljšanja prilikom planiranja i eksploatacije cestovne infrastrukture.		
Ciljevi održivog razvoja (COR):	SDG4 – Kvalitetno obrazovanje SDG5 - Rodna ravnopravnost SDG8 - Dostojanstven rad i ekonomski rast SDG9- Industrija, Inovacije i Infrastruktura SDG11 – Održivi gradovi i lokalne zajednice		

<table>
<tr><td></td><td>SDG12 - Održiva potrošnja i proizvodnja
SDG13 - Zaštita klime
SDG17 - Partnerstvom do ciljeva</td></tr>
<tr><td>Metode izvođenja nastave:</td><td>Usmeno iznošenje sa prezentacijom i prikazom različitih saobraćajnih situacija uz korištenje video i audio zapisa, te samostalno izlaganje pojedinih praktičnih problema infrastrukture cestovnog saobraćaja na konkretnim primjerima. Iniciranje rasprava i diskusija o problemima iz prakse, pojedinačnih zapažanja iz različitih okruženja, izrada samostalnih projektnih zadataka, kao i elaborata za unaprijeđenje cestovne infrastrukture.</td></tr>
<tr><td>Metode provjere znanja sa strukturom ocjene:</td><td>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:
– Seminar 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:
<table>
<tr><td>Obaveze studenta</td><td>Bodovi (%)</td></tr>
<tr><td>Prisutnost na predavanjima i vježbama. (obavezno je prisustvu svim oblicima nastave min. 80 % i ovo je uslov za ovjeru/potpis urednog pohađanja)</td><td>0 bodova</td></tr>
<tr><td>Seminar</td><td>15 bodova (%)</td></tr>
<tr><td>I Parcijalni ispit/Test/Provjera znanja/</td><td>35 bodova (%)</td></tr>
<tr><td>Završni ispit (II Parcijalni)</td><td>50 bodova (%)</td></tr>
<tr><td>Završni ispit (Integralni)</td><td>85 bodova (%)</td></tr>
</table></td></tr>
<tr><td>Literatura:</td><td>Obavezna:
1. Božičević, J., Ceste I i II, Fakultet prometnih znanosti Zagreb, 1993.
2. Božičević, J., Topolnik, D., Propusna moć višestraničnih cesta, Znanstveni savjet za promet HAZU, Zagreb, 1992.
3. Bublin, M., Planiranje saobraćaja i saobraćajnica, Sarajevo 2007.</td></tr>
</table>

	4. Bublin, M.,Funkcionalne karakteristike saobraćajnica, Sarajevo 2012. 5. European green deal (2019). 6. Klemenčić, A., Oblikovanje cestovnih čvorišta izvan razine, Fakultet prometnih znanosti Zagreb, 1992. 7. Maletin, M., Planiranje i projektovanje saobraćajnica u gradovima, Beograd 2005. 8. Mazić, B., Lovrić, I., Ceste, Građevinski fakultet Sarajevo, 2009. 9. Mazić, B., Lovrić, I., Ceste, Sarajevo, 2010. 10. Smjernice za projektovanje, građenje, održavanje i nadzor na putevima, Sarajevo/Banja Luka 2005. 11. Sustainable and smart mobility strategy EU (2020). 12. Sustainable and Smart Mobility Strategy -Western Balkans (2021). Dopunska: 1. Action plans for Road, Transport Community 2. Branković, N., Džaferović S., Infrastruktura cesotvnog saobraćaja – Skripta, Fakultet za saobraćaj i komunikacije Sarajevo, 2018. 3. Kiretiji za kategorizaciju cesta 4. Okvirna prometna politika BiH 2015-2030 5. Okvirna prometna strategija BiH 2016-2030 6. Pravilnici proizašli iz Zakona osnovama sigurnosti saobraćaja na putevima u BiH iz oblasti cestovne infrastrukture 7. Road action plan Western Balkan (2020). 8. Road Safety Manual, PIARC - World Road Association 9. Uredba 1315/2013, Direktiva 2019/1936, 2004/54 itd. 10. Zakon o cestama FBiH 11. Zakon o eksproprijaciji 12. Zakon o koncesijama 13. Zakon o osnovama sigurnosti saobraćaja na putevima u BiH 14. Zakon o prostornom planiranju i korištenju zemljišta na nivou FBiH,

Šifra predmeta: 24-25-1TRTES010305	**Naziv predmeta:** TEHNIČKA EKSPLOATACIJA CESTOVNIH VOZILA		
Ciklus: I	**Godina: III**	**Semestar: V**	**Broj ECTS kredita: 6**
Status: Izborni predmet		**Ukupan broj kontakt sati: 90** Predavanja 45 Vježbe 25 Seminar 10 Praksa 10	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**		
Preduslov za upis:	Ne		
Cilj (ciljevi) predmeta:	Ovladavanje znanja o racionalnoj eksploataciji cestovnih vozila i sredstvima tranportnog rada u transportnoj privredi. Analiza i proračun tehničko-eksplotacionih karakteristika vozila čije poznavanje predstavljaju bazu za izbor optimalnog vozila za određene uslove eksploatacije. Postavljane dinamičkih modela cestovnih vozila u procesu vuče i kočenja, kretanja u krivini, stabilnosti i prohodnosti cestovnih vozila, u cilju određivanja potrebnih podataka pri ekpertizama saobraćajnih nezgoda kao i procesu upravljanja sigurnošću saobraćaja.		

Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)*	1. Osnovi teramehanike 2. Kotrljanje točka. Opšti slučaj kotljanja pogonskog točka 3. Koeficijent prijanjanja. Sila prijanjanja. Klizanje točka. Kotrljane točka pod djelovanjem bočne sile 4. Raspodjela težina i koordinate težišta 5. Sile otpora pri kretanju cestovnih vozila 6. Određivanje ukupnih reakcija tla na osovine vozila. 7. Granične performanse cestovnih vozila 8. Vučno brzinske - karakteristike cestovnih vozila 9. Diferencijlna jednačina kretanja vozila 10. Proces kočenje cestovnih vozila. 11. Teoretski parametri procesa kočenja.Stvarni proces kočenja. Raspodjela kočionih sila na osovine vozila. 12. Stabilnost cestovnih vozila 13. Zakretanje automobila na poprečno nagnutom putu 14. Ekonomičnost potrošnje goriva 15. Prohodnost vozila
Ishodi učenja:	Znanje: Poznavanje osnovnih zakona kretanja cestovnog vozila-dinamike vozila u različitim uslovima eksploatacije. Vještine: Sposobnost ocjene tehničko eksploatacionih karakteristika vozila. Postavljanje dinamičkog modela vozila za izračun potrebnih podataka o kinematičkim i dinamičkim karakteristikama vozila prije i poslije saobraćajne nezgode. Sposobnost prepoznavanja osnovnih karakteristika naučnog istraživanja. Sposobnost prenošenja zaključaka i razloga koji su do njih doveli. Kompetencije: Kroz nastavni proces predavanja, vježbi, seminara i stručne prakse student će biti sposoban, na osnovu usvojenog znanja da: – Pravilno pristupi izboru optimalnog vozila za određene uslove eksploatacije, odnosno da ocjeni u kojoj mjeri tehničko-eksplotacione karakteristike datog vozila zadovoljavaju date uslove eksploatacije. – Analizira i izvrši ocjenu dinamičkih karakteristika vozila sa aspekta vuče i kočenja, stabilnosti, prohodnosti i ekonomičnosti potrošnje goriva jednog vozila ili da uporedi navedene karakteristike različinih vozila. – Na osnovu podataka o saobraćajnoj nezgodi postavi dinamički model vozila i izračuna potrebne podatke o kinematičkim i dinamičkim karakteristikama vozila prije i u toku saobraćajne nezgode. – Koristi tehničku literaturu, priručnike i tabele iz ove oblasti. – Prati i usvaja znanja iz stručnih predmeta koji se odnose na sigurnost cestovnog saobraćaja.
Cilj održivog razvoja (SDG):	SDG3 – Zdravlje i blagostanje SDG9 – Industrija, inovacije i infrastruktura
Metode izvođenja nastave:	– Samostalno izlaganje – Diskusija – Analiza primjera iz prakse (zadaci, seminarski radovi)
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 55 %.

	– I Parcijalni ispit/test/provjera znanja/35 bodova (%), položen je ako se osvoji preko 55 %. – Završni ispit (II Parcijalni) 50 bodova (%), položeno ako se osvoji preko 55 %. – Završni ispit (Integralni) 85 bodova (%), položeno ako se osvoji preko 55 %. 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: Obaveze studenta Bodovi (%) Prisutnost na predavanjima i vježbama.....80 (%) 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. B.Pikula, S.Dacić, Osnovi dinamike vozila , Mašinski Fakultet, Sarajevo, 2017. 2. S.Dacić, B.Pikula, M.Trobradović, Dinamika vozila- zbirka zadataka , Mašinski Fakultet , Sarajevo, 2008. 3. R. Dučić, Dinamika ABS, Fakultet za Saobraćaj i komunikacije, Sarajevo,1995. Dopunska: 1. D. Janković, Motorna vozila, Mašinski fakultet, Beograd, 1993. 2. D.Janković, J.Todorović, Teorija kretanja motornih vozila, Mašinski fakultet,Beograd,1983. 3. Jazar, N.R. :Vehicle Dynanics- theory and applicataion, Dept. of Mechanical Engineering Manhattan College Riverdale, NY 10471 4. Dedović,V.: Dinamoka vozila, Univerzitet u Beogradu, Saobraćajni fakultet, Beograd, 2004.

Šifra predmeta:	**Naziv predmeta:**
24-25-2TRTES010305	MULTIMODALNI TRANSPORT

Ciklus: I	**Godina: III**	**Semestar: V**	**Broj ECTS kredita: 6**
Status: Izborni predmet		**Ukupan broj kontakt sati:** 90 Predavanja: 45 Vježbe: 30 Seminar: 15	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**		
Preduslov za upis:	Obavezno je prisustvo i aktivnost na predavanjima i vježbama, te izrada seminarskog rada i zadataka za samostalne vježbe		
Cilj (ciljevi) predmeta:	Nastavna materija koja je obuhvaćena sadržajem, treba da omogući studentima upoznavanje sa savremenim transportnim lancima, osnovama tehnološkog projektovanja i racionalizacije transportnih procesa kao i sa savremanim tehnološkim rješenjima koja se nude u okviru pojedinih tehnologija multimodalnog transporta i uz primjenu principa logistike i mogućnosti koje pružaju nove informacione i telekomunikacijske tehnologije.		
Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)*	1. Osnovne karakteristike savremenih tehnoloških promjena u društvu, privredi i transportu. 2. Transportni lanci. Tehnologije klasičnog transportnog lanca. Industrijski transport. 3. Sistemski pristup analizi transportnog procesa kao složenog tehnološkog sistema 4. Paletni sistem transporta 5. Kontejnerski sistem transporta. 6. Tipične tehnologije za realizaciju kontejnerskog transportnog lanca 7. Sistemi «vozilo – vozilo» 8. Integralni kopneno – pomorski sistemi transporta. 9. Integralni pomorsko – riječni sistemi transporta. Sistemi multimodalnog transporta u PT saobraćaju. 10. Kontejnerski terminali, HUCKE – PACK terminali, RO – RO terminali 11. Robno transportni centri (RTC) 12. Uvođenje principa logistike u planiranje transportnih lanaca 13. Tehnološke funkcije podsistema marketing logistike, logistika sa aspekta savremene transportne i špediterske organizacije, 14. Skladišni sistemi, teorija zaliha 15. Konkretna istraživanja i projektovanje savremenih logističkih i transportnih lanaca.		
Ishodi učenja:	Studenti kroz nastavni proces predavanja, vježbe i praktičan rad trebaju steći odgovarajuća znanja i iskustva za praktičnu primjenu u oblasti savremenih tehnologija robnog transporta. Također predmet omogućava sticanje znanja i vještina neophodnih za adekvatnu analizu, procjenu i upravljanje transportnim tokovima zasnovano na logističkim principima.		
Cilj održivog razvoja (SDG):	SDG 8 - Dostojanstven rad i ekonomski rast SDG 9 - Industrija, inovacije i infrastruktura SDG 11 - Održivi gradovi i zajednice SDG 12 - Odgovorna proizvodnja i potrošnja SDG 14 - Život u vodi		
Metode izvođenja nastave:	Nastava se realizira kroz izvođenje predavanja, vježbi i praktičnog dijela nastave koja uključuje izradu projektnih zadataka. Predavanja se realizuju kroz usmeno izlaganje sa prezentacijom i prikazom primjera iz prakse. Studenti će biti obavezni izraditi i prezentirati seminarske radove i/ili projektne zadatake.		

	U realizaciji nastave se koriste različite metode koje uključuju: usmeno izlaganje i diskusije, demonstracije primjera, metoda grafičkih i video prikaza i potenciranje rada u grupama primjenom odgovarajućih metodoloških pristupa.
Metode provjere znanja sa strukturom ocjene:	Kriterijum vrednovanja rada i ocjenjivanja studenta u toku nastave, vrši se na sljedeći način: Prisustvo nastavi i vježbama će se voditi, prisustvo nastavi i vježbama je obavezno kao uslov za polaganje ispita uz max. 10% izostanaka bez opravdanja. Redovno prisustvo se neće dodatno bodovati. Domaća zadaća/seminarski rad/praktični rad/ od 0 do 15 bodova, a ocijeniti će se samo oni studenti koji su zadovoljili preko 50 % od navedenih obaveza; U toku nastave će se organizovati samo jedna provjera znanja - Parcijalni ispit u 8 ili 9 sedmici nastave sa vrednovanjem od 35 bodova, stim da će se bodovati samo oni studenti koji su položili preko 50 % od navedenog parcijalnog ispita.Završni ispit iznosi najviše 50 bodova.
Literatura:	Obavezna: 1. Dalla Chiara B., Ercolani F., Gačanin E., Kiso F.: Intermodalni transport, Education and Culture TEMPUS , Sarajevo 2004. 2. Perišić R.: Savremene tehnologije transporta I, Saobraćajni fakultet Beograd, 1994. 3. Perišić R.: Savremene tehnologije transporta II, Saobraćajni fakultet Beograd, 1995. 4. Marković I.: Nove tehnologije transporta, Fakultet prometnih znanosti Zagreb, 1985. 5. Terminologija u kombiniranom transportu: UN/ECE, Prevod Kiso F., Education and Culture TEMPUS, Sarajevo, 2004. 6. Kiso F., Karičić S.: Nastavni materijali, prezentacije i Skripta „Skladištenje“

Šifra predmeta: 24-25-3TRTES010305	**Naziv predmeta:** NADZOR I REGULISANJE CESTOVNOG SAOBRAĆAJA		
Ciklus: I	**Godina: III**	**Semestar: V**	**Broj ECTS kredita: 6**
Status: Izborni predmet		**Ukupan broj kontakt sati: 90** Predavanja 45 Vježbe 30 Seminarski rad 15	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**		
Preduslov za upis:	Ne.		
Cilj (ciljevi) predmeta:	Sticanje znanja i vještina potrebnih u realizaciji programa iz područja nadzora i reguliranja cestovnog prometa, analiza učinka upravljačkih funkcija na promjene parametara stanja u cestovnom prometu.		
Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)*	1. Uloga i značaj nadziranja i reguliranja u cestovnom prometu 2. Tehnologije prikupljanja i analize podataka u cestovnom prometu 3. Upravljanje operacijama na cestovnoj mreži 4. Centri za upravljanje prometom 5. Relevantne veličine prometnog toka za upravljanje cestovnim prometom 6. Upravljanje prometom na autocestama 7. Upravljanje prometnim tokovima na gradskoj cestovnoj mreži 8. Upravljanje prometom na raskrižjima		

	9. Upravljanje incidentima na cestovnoj mreži 10. Projektiranje svjetlosnih signala za reguliranje prometa na raskrižjima 11. Signalni plan semaforiziranih raskrižja 12. Kapacitet semaforiziranih raskrižja 13. Nivo usluge semaforiziranih raskrižja 14. Koordinacija rada svjetlosnih signala 15. Upravljanje prometom u ITS okruženju
Ishodi učenja:	Znanje: Predmet Nadzor i reguliranje cestovnog saobraćaja treba osigurati potreban nivo znanja o metodama i postupcima nadziranja procesa u cestovnom prometu te kreiranje i provođenje upravljačkih funkcija kako bi se povećala učinkovitost i sigurnost u cestovnom prometu. Vještine: Predmet omogućava stjecanje vještina neophodnih za mjerenje, analizu i procjenu utjecaja upravljačkih funkcija i mjera provođenja nadzora na odvijanje cestovnog prometa. Kompetencije: Studenti kroz nastavni proces predavanja, vježbe, i seminarski rad trebaju steći odgovarajuće kompetencije za dizajniranje, razvoj i korištenje metoda nadziranja i upravljanja procesima u cestovnom prometu.
Cilj održivog razvoja (SDG):	SDG3 – Zdravlje i blagostanje SDG9 - Industrija, inovacije i infrastruktura SDG11 - Održivi gradovi i zajednice SDG 13 - Zaštita klime
Metode izvođenja nastave:	Predavanja, vježbe i seminarski rad
Metode provjere znanja sa strukturom ocjene:	1. Prisustvo na na nastavi i semiraski rad 15 bodova 2. Prva provjera znanja 35 bodova 3. Završna provjera znanja 50 bodova
Literatura:	Obavezna: 1. Ezgeta,D: Nadzor i upravljanje cestovnog prometa, Fakultet za saobraćaj i komunikacije univerziteta u Sarajevu, Sarajevo, 2024. Dopunska: 1. Croft, Guide to traffic management, Part 1: Introduction to 2. traffic management, Sydney, Australia: Austroroads, 2009. 3. M. Dalgleish, i N. Hoose, Highway Traffic Monitoring and Data Quality, London: Artech House, 2008. 4. J. Barcelo i M. Kuwahara, Traffic Data Collection and its Standardization, London: Springer, 2010. 5. J.C. Falcocchio, S. Levinson, Road Traffic Congestion: A Concise Guide, London: Springer, 2015. 6. K. Ozbay , P. Kachroo, Incident management in intelligent transportation systems, Boston: Artech House, 1999. 7. Ni, Signalized Intersections-Fundamentals to Advanced Systems, Cham, Switzerland : Springer Nature Switzerland AG, 2020. 8. MUTCD Manual of Uniform Traffic Control Devices, Washington: Federal Highway Administration, 2009. 9. N. Čelar, S. Stanković, J. Kajalić, Osnove upravljanja svjetlosnom signalizacijom, Beograd, Univerzitet u Beogradu, Saobraćajni fakultet, 2020. 10. A.Ferrara, S. Sacone, and S. Siri, Freeway Traffic Modelling and Control, Cham, Switzerland: Springer, 2018.

	11. L. Deka, M. Chowdhury, Transportation Cyber-Physical Sysems, Amsterdam: Elsevier, 2018.

Šifra predmeta: 27TRTOS010306	**Naziv predmeta:** SIGURNOST CESTOVNOG SAOBRAĆAJA		
Ciklus: I	**Godina: III**	**Semestar: VI**	**Broj ECTS kredita: 6**
Status: Obavezni predmet		**Ukupan broj sati: 90** Predavanja: 30, Vježbe: 20, Seminar: 10, Laboratorijske vježbe: 10, Praksa: 10, Terenski rad: 10.	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**		
Preduslov za upis:	NE		
Cilj (ciljevi) predmeta:	Sticanje edukacijskih, teorijskih i praktičnih znanja u realizaciji programa sigurnosti cestovnog saobraćaja, iznalaženju i analizama indikatora sigurnosti cestovnog saobraćaja.		
Tematske jedinice:	1. Uvod – osnove sigurnosti cestovnog saobraćaja 2. Zakoni i pravila u sigurnosti saobraćaja 3. Elementi sigurnosti u saobraćaju 4. Psiho - fizičke karakteristike učesnika u saobraćaju 5. Elementi sigurnosti infrastrukture u saobraćaju 6. Elementi sigurnosti motornih vozila 7. Elementi sigurnosti okruženja cestovne infrastrukture 8. Analize kretanja vozila za sigurno kretanje i učestvovanje u saobraćaju 9. Analize kretanja motocikala za sigurno kretanje i učestvovanje u saobraćaju 10. Analize kretanja pješaka za sigurno kretanje i učestvovanje u saobraćaju 11. Analize kretanja bicikala i romobila za sigurno kretanje i učestvovanje u saobraćaju 12. Elementi saobraćajnih nezgoda 13. Indikatori sigurnosti cestovnog saobraćaja 14. Preventiva i kampanje za poboljšanje sigurnosti cestovnog saobraćaja		
Ishodi učenja:	Znanje: Teorijska i praktična znanja iz oblasti sigurnosti cestovnog saobraćaja. Osnovni propisi, pravila, metode i postupci u oblasti saobraćajne prevencije, analize i sistema upravljanja sigurnošću cestovnog saobraćaja. Vještine: Sposobnost primjene teorijskih i praktičnih znanja iz oblasti sigurnosti cestovnog saobraćaja u funkciji upravljanja sigurnošću cestovnog saobraćaja. Kompetencije: Sposobnosti samostalnog razumijevanja i korištenja propisa, korištenja stručne literature, primjene metoda i postupaka, mjerenja indikatora istraživanja, izrada analiza, procjena i praktičnih rješenja u funkciji upravljanja i poboljšanja sigurnosti cestovnog saobraćaja.		
Ciljevi održivog razvoja (COR):	SDG4 – Kvalitetno obrazovanje SDG5 - Rodna ravnopravnost SDG8 - Dostojanstven rad i ekonomski rast SDG9 - Industrija, Inovacije i Infrastruktura SDG11 – Održivi gradovi i lokalne zajednice - SDG17 - Partnerstvom do ciljeva		

<table>
<tr><td>Metode izvođenja nastave:</td><td>Usmeno iznošenje sa prezentacijom i prikazom različitih sistema i procesa iz oblasti sigurnosti cestovnog saobraćaja uz korištenje video i audio zapisa, te samostalno izlaganje pojedinih konkretnih problema sigurnosti cestovnog saobraćaja na konkretnom području istraživanja. Iniciranje rasprava i diskusija o problemima iz prakse, pojedinačnih zapažanja iz različitih okruženja. Izrada samostalnih istraživanja i analiza iz oblasti sigurnosti cestovnog saobraćaja u okviru laboratorije, na terenskim uslovima i drugim specifičnim uslovima proizvodnih i uslužnih procesa.</td></tr>
<tr><td>Metode provjere znanja sa strukturom ocjene:</td><td>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:
– Seminar 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:
<table>
<tr><td>Obaveze studenta</td><td>Bodovi (%)</td></tr>
<tr><td>Prisutnost na predavanjima i vježbama
(obavezno je prisustvu svim oblicima nastave min. 80 % i ovo je uslov za ovjeru/potpis urednog pohađanja)</td><td>0 bodova</td></tr>
<tr><td>Seminar</td><td>15 bodova (%)</td></tr>
<tr><td>I Parcijalni ispit/Test/Provjera znanja/</td><td>35 bodova (%)</td></tr>
<tr><td>Završni ispit (II Parcijalni)</td><td>50 bodova (%)</td></tr>
<tr><td>Završni ispit (Integralni)</td><td>85 bodova (%)</td></tr>
</table></td></tr>
<tr><td>Literatura:</td><td>Obavezna:
1. Lindov, O., Sigurnost u cestovnom saobraćaju, Fakultet za saobraćaj i komunikacije Univerziteta u Sarajevu, Sarajevo, 2008.
2. Lindov, O., Priručnik o poznavanju elemenata i pravila sigurnosti saobraćaja na putevima – licenca za predavača i ispitivača, Fakultet za saobraćaj i komunikacije Univerziteta u Sarajevu, Institut za saobraćaj i komunikacije , Sarajevo, 2009.</td></tr>
</table>

	3. Lindov, O., Saobraćajna kultura, Fakultet za saobraćaj i komunikacije Univerziteta u Sarajevu, Sarajevo, 2012. 4. Lindov, O., Omerhodžić, A. Sigurnost u cestovnom saobraćaju - skripta zadataka, testovi za polaganje, Fakultet za saobraćaj i komunikacije Univerziteta u Sarajevu, Sarajevo, 2013. 5. Lindov, O., Omerhodžić, A. Sigurnost u cestovnom saobraćaju - skripta predavanja, Fakultet za saobraćaj i komunikacije Univerziteta u Sarajevu, Sarajevo, 2013. 6. Lindov, O., Priručnik za jačanje kapaciteta profesije bezbjednosti saobraćaja, Fakultet za saobraćaj i komunikacije Univeziteta u Sarajevu, Erasmus+ projekat Trafsaf, Sarajevo, 2020. 7. Rotim, F., Elementi sigurnosti cestovnog prometa, Svezak 1, Ekspertize prometnih nezgoda, Suvremeni promet, Zagreb, 1990. Dopunska: 1. Cerovec, V., Tehnika i sigurnost cestovnog prometa, Fakultet prometnih znanosti, Zagreb, 2001. 2. Dragač, R., Bezbednost drumskog saobraćaja, Knjiga I,II,III, Saobraćajni Fakultet, Beograd, 1982.,1983.,1994. 3. Golubić, J., Osnove tehnike i sigurnosti prometa. Fakultet prometnih znanosti, Zagreb, 1999. 4. Lindov, O., Čaušević, S., Omerhodžić, A., Bjelica, D., Metodologija ispitivanja validnosti softverskih aplikacija za analizu prometne nezgode, Suvremeni promet, Zagreb, 2011. 5. Lindov, O., Kazivanja o saobraćaju – Hronologija odabranih kazivanja u medijima 2002-2012, Institut za saobraćaj i komunikacije, Udruženje inžinjera u Bosni i Hercegovini, Sarajevo, 2013. 6. Milošević, S., Teorije saobraćajnih nezgoda, Saobraćajni fakultet, Beograd,1994. 7. Rotim, F., Elementi sigurnosti cestovnog prometa, Svezak 2, Kinetika vozila, Suvremeni promet, Zagreb, 1991. 8. Rotim, F., Elementi sigurnosti cestovnog prometa, Svezak 3, Sudari vozila, Suvremeni promet, Zagreb, 1992. 9. Vujanić, M., Zbirka rešenih zadataka iz bezbednosti saobraćaja, Saobraćajni Fakultet, Beograd, 1991.

Šifra predmeta: 28TRTOS010306	**Naziv predmeta:** TEHNOLOGIJA CESTOVNOG TRANSPORTA		
Ciklus: I	**Godina: III**	**Semestar: VI**	**Broj ECTS kredita:** 6
Status: Obavezni predmet		**Ukupan broj sati: 90**	
Učesnici u nastavi	**Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet**		
Preduslov za upis:	NE		
Cilj (ciljevi) predmeta:	Sticanje praktičnih znanja u realizaciji programa iz tehnologije cestovnog transporta, te sposobnost izrade praktičnih analiza postojećeg stanja, tehničko-eksploatacionih parametara voznog parka, kao i prijedloga mjera za unaprjeđenje rada voznog parka.		
Tematske jedinice:	1. Uvod – osnove tehnologije cestovnog transporta		

	2. Osnovni zakoni i podzakonski akti u unutrašnjem i međunarodnom cestovnom transportu tereta i putnika 3. Oblici organizacije transportnih preduzeća 4. Prijevozni putevi u organizaciji cestovnog transporta putnika i tereta 5. Tehničke karakteristike transportnih sredstava 6. Elementi i koeficijenti rada voznog parka 7. Elementi i koeficijenti vremenskog bilansa rada voznog parka 8. Metode izračuna transportnog rada i ukupno prevezenih putnika i tereta 9. Metode izračuna pređene kilometraže voznog parka 10. Analiza proizvodnosti voznog parka 11. Analiza proizvodnosti voznog prema ponašanju pojedinih parametara 12. Analiza transportnih troškova voznog parka 13. Analiza cijene koštanja transportnih usluga 14. Koordinacija kretanja vozila i rada utovarno istovarnih stanica 15. Metode formiranja transportne mreže na izvršenju transportnog zadatka
Ishodi učenja:	Znanje: Teorijska i praktična znanja iz oblasti tehnologije cestovnog transporta. Osnovni propisi, pravila, metode i postupci u oblasti organizacije transportnih zadataka, analiza tehničko-eksploatacionih parametara, kao i unaprijeđenje prilikom izvršenje transportnih zadataka. Vještine: Sposobnost primjene teorijskih i praktičnih znanja iz oblasti tehnologije cestovnog transporta u funkciji efikasne i efektivne realizacije transportnih zadataka. Kompetencije: Sposobnosti samostalnog razumijevanja i korištenja propisa, korištenja stručne literature, primjene metoda i postupaka, mjerenja i istraživanja, izrada analiza, procjena i praktičnih rješenja u funkciji realizacije i daljeg poboljšanja prilikom planiranja i realizacije transportnog zadatka.
Ciljevi održivog razvoja (COR):	SDG4 – Kvalitetno obrazovanje SDG5 - Rodna ravnopravnost SDG8 - Dostojanstven rad i ekonomski rast SDG9 - Industrija, Inovacije i Infrastruktura SDG11 – Održivi gradovi i lokalne zajednice SDG12 - Održiva potrošnja i proizvodnja SDG13 - Zaštita klime SDG17- Partnerstvom do ciljeva
Metode izvođenja nastave:	Usmeno iznošenje sa prezentacijom i prikazom različitih sistema i procesa iz oblasti tehnologije cestovnog transporta uz korištenje video i audio zapisa, te samostalno izlaganje pojedinih konkretnih tehnoloških problema na konkretnom području istraživanja. Iniciranje rasprava i diskusija o problemima iz prakse, pojedinačnih zapažanja iz različitih okruženja, izrada samostalnih istraživanja i analiza iz tehnologije cestovnog transporta, na praktičnim primjerima i drugim specifičnim uslovima.
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: – Seminar 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 %.

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– 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:
<table>
<tr><td>Obaveze studenta</td><td>Bodovi (%)</td></tr>
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<tr><td>Seminar</td><td>15 bodova (%)</td></tr>
<tr><td>I Parcijalni ispit/Test/Provjera znanja/</td><td>35 bodova (%)</td></tr>
<tr><td>Završni ispit (II Parcijalni)</td><td>50 bodova (%)</td></tr>
<tr><td>Završni ispit (Integralni)</td><td>85 bodova (%)</td></tr>
</table>
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<tr>
<td>Literatura:</td>
<td>
Obavezna

1. Adamović , A., Uvod u saobraćaj, Saobraćajni fakultet Beograd, 2000.
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3. Lindov, O., Tehnologija cestovnog transporta – Skripta predavanja, Fakultet za saobraćaj i komunikacije Sarajevo, 2013.
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5. Lindov, O., Tehnologija drumskog transporta – Skripta zadataka, Fakultet za saobraćaj i komunikacije Sarajevo, 2007.
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Šifra predmeta: 29TRTOS010306	**Naziv predmeta:** PLANIRANJE CESTOVNOG SAOBRAĆAJA		
Ciklus: I	**Godina: III**	**Semestar: VI**	**Broj ECTS kredita:** 6
Status: Obavezni predmet		**Ukupan broj sati: 90**	
Učesnici u nastavi:	Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet		
Preduslov za upis:	NE		
Cilj (ciljevi) predmeta:	Sticanje edukacijskih oblika u realizaciji programa iz oblasti planiranje cestovnog saobraćaja. Sticanje znanja i vještina iz planiranja cestovnog saobraćaja.		

Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)*

R.b.	Nastavne cjeline	Broj sati (P+V+L+S+Sr)
1.	Osnove planiranja i projektovanja u saobraću i prevozu	3+2+1+2+2
2.	Osnovni elementi saobraćajnih i prevoznih sistema u gradu relevantni za planiranje i projektovanje	3+2+1+2+2
3.	Osnovni elementi saobraćajnih i prevoznih sistema u regiji i širim prostorima relevantni za planiranje i projektovanje	3+2+1+2+2
4.	Potražnja za uslugama u saobraćaju i prevozu	3+2+1+2+2
5.		3+2+1+2+2
6.	Ponuda usluga u saobraćaju i prevozu	3+2+1+2+2
7.	Mtodološke osnove planiranja u saobraćaju i prevozu	3+2+1+2+2
8.		3+2+1+2+2
9.	Priprema i izrada planova u saobraćaju	3+2+1+2+2
10.	Nove tehnologije za izradu planova u saobraćaju i prevozu	3+2+1+2+2
11.	Osnove projektovanja u saobraćaju i prevozu	3+2+1+2+2
12.	Osnove plnairanja i projektovanja terminala u saobraćaju	3+2+1+2+2
13.	Troškovi korisnika usluga saobraćajnih i prevoznih sistema	3+2+1+2+2
14.	Vrednovanje planova i projekata u saobraćaju i prevozu	3+2+1+2+2
15.	Odlučivanje i upravljanje u planiranju i projektovanju u saobraćaju i prevozu	3+2+1+2+2

Ishodi učenja: (Znanje; vještine; kompetencije)	Studenti kroz nastavni proces predavanja, vježbi i praktičan rad trebaju steći odgovarajuća znanja vezano za planiranje u saobraćaju. Izučavanje i praktična primjena, treba da osigura potreban nivo znanja za utvrđivanje karakteristika stanja saobraćajno-transportnih sistema na putnoj i uličnoj mreži, prognoza prevoznih zahtjeva individualnih i javnih vidova prevoza, formiranje varijanti razvoja saobraćajno-transportnih sistema na

	cestovnim gadskim i vangradskim saobraćajnicama, vrednovanje varijantnih rejšenja i izbor optimalnog plana razvoja saobraćajno-transportnog sistema, primjena i praćenje realizacije plana.
Cilj održivog razvoja (SDG):	SDG4 – Inkluzivno i kvalitetno obrazovanje SDG9 - Industrija, inovacije i infrastruktura SDG11 - Održivi gradovi i zajednice SDG12 - Održiva potrošnja i proizvodnja SDG13 - Klimatska akcija
Metode izvođenja nastave:	Predavanja, vježbe i izrada seminarskog rada sa praktičnim osvrtom. Analitički i demonstracioni pristup.
Metode provjere znanja sa strukturom ocjene:	Praćenje rada studenta se vrši dodjeljivanjem bodova za svaki oblik aktivnosti i provjere znanja u toku semestra, kao i na završnom ispitu nakon završetka semestra prema sljedećim elementima praćenja: – Domaća zadaća/seminarski rad/praktični rad/ 15 bodova (%), vrednuje se ako je položeno preko 50 % – I Parcijalni ispit/I test/I provjera znanja/35 bodova (%), vrednuje se ako je položeno preko 50 % – Završni ispit (II Parcijalni) 50 bodova (%), vrednuje se ako je položeno preko 50%. – Završni ispit (Integralni) 85 bodova (%), vrednuje se ako je položeno 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 vrednuje se sa 85 bodova (%), što sa seminarskim radom/praktičnim radom čini 100 bodova (%). Konačan uspjeh studenata 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 85-94.99 boda; c) 8 (C) - prosječan, sa primjetnim greškama, nosi 75-84,99 boda; d) 7 (D) - općenito dobar, ali sa značajnim nedostacima, nosi 65-74,99 boda; e) 6 (E) - zadovoljava minimalne uslove, nosi 55-64,99 boda; f) 5 (F, FX) - ne zadovoljava minimalne uslove, manje od 55 bodova.
Literatura:	Obavezna: 1. Mehanović, M., 2017. „Planiranje u saobraćaju, prevozu i komunikacijama“. Fakultet za saobraćaj i komunikacije u Sarajevu, Sarajevo. 2. Padjen J.: Osnove prometnog planiranja, Zagreb, 1986. Dopunska: 1. Padjen J.: Metode prostorno-prometnog planiranja Ekonomski institut, Zagreb, 1978. 2. Mehanović, M., 2011. „Planiranje ponude usluga u gradskom prometu putnika“. Fakultet za saobraćaj i komunikacije u Sarajevu, Sarajevo. 3. Mehanović, M.: “Zadaci i primjeri iz teorije i prakse u javnom gradskom prevozu putnika”, Fakultet za saobraćaj i komunikacije, Sarajevo, 2005. 4. Meyer, M.D. Miller, E.J.: Urban Transportation Planning, McGraw-Hill, 1984.

	5. Kuzović, Lj.; Topolnik, D.: Kapacitet drumskih saobraćajnica, Građevinska knjiga Beograd, 1989. 6. Jovanović N.: Planiranje saobraćaja, Saobraćajni fakultet, Beograd, 1990. 7. Jović J.: Planiranje saobraćaja u gradovima-praktikum, Saobraćajni fakultet, Beograd, 1996. 8. HZDP Zagreb, Časopisi

Šifra predmeta: 30-31-1TRTES010306	**Naziv predmeta:** DIJAGNOSTIKA I ODRŽAVANJE CESTOVNIH VOZILA		
Ciklus: I	**Godina: III**	**Semestar: VI**	**Broj ECTS kredita: 6**
Status: Izborni predmet		**Ukupan broj sati: 90** Opciono razraditi distribuciju sati po tipu: 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:	Sticanje edukacijskih oblika u realizaciji programa iz dijagnostike i održavanja cestovnih vozila, praktična primjena dijagnostičkih uređaja, te analiza stanja tehničke ispravnosti vozila i mjerenje parametara.		
Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)*	1. Uvod – osnove dijagnostike i održavanja cestovnih vozila 2. Klasifikacija i identifikacija vozila 3. Tehnološke osnove održavanja vozila 4. Promjene stanja vozila i njihovi uzroci 5. Tehnološke osnove dijagnostike 6. Dijagnostički sistem i elementi dijagnostike 7. Tehnologija dijagnosticiranja 8. Tehnologije preventivnih održavanja 9. Tehnologije korektivnih održavanja 10. Dijagnostika i održavanje osnovnih sistema motora 11. Dijagnostika i održavanje osnovnih sistema vozila 12. Tehnički pregled motornih vozila 13. Homologacija motornih vozila 14. Certificiranje motornih vozila 15. Zaključna razmatranja o dijagnostici i održavanju cestovnih vozila		
Ishodi učenja: (Znanje; vještine; kompetencije)	Studenti kroz nastavni proces predavanja, vježbe i praktičan rad trebaju steći odgovarajuća znanja i iskustva za praktičnu primjenu u oblasti dijagnostike i održavanja cestovnih vozila, te omogućiti primjenjiva znanja i vještine neophodne za rad na stanicama tehničkih pregleda. Izučavanjem, studentima treba osigurati potreban nivo znanja o metodama i postupcima dijagnostike i održavanja vozila. Materijalom iz ove discipline omogućava se sticanje znanja i vještina neophodnih za primjenu u certificiranju i homologiranju cestovnih vozila, te organizaciju i upravljanje sistemom dijagnostike i održavanja vozila.		
Cilj održivog razvoja (SDG):	SDG9 - Izgraditi izdržljivu infrastrukturu, promovirati uključivu i održivu industrijalizaciju i poticati inovativnost SDG11 - Učiniti gradove i naselja inkluzivnim, sigurnim, prilagodljivim i održivim SDG12 - Osigurati održive oblike potrošnje i proizvodnje		

	SDG13 - Poduzeti hitne akcije u borbi protiv klimatskih promjena i njihovih posljedica
Metode izvođenja nastave:	Predavanja, vježbe i izrada seminarskog rada sa praktičnim osvrtom.
Metode provjere znanja sa strukturom ocjene:	Kriterijum vrednovanja rada i ocjenjivanja studenta u toku nastave, vrši se na sljedeći način: Prisustvo nastavi i vježbama od 0 – 10 bodova (%); Domaća zadaća/seminarski rad/praktični rad/ od 0 do 10 bodova (%); I parcijalni ispit/I test/ I provjera znanja/ od 0 do 15 bodova (%); II parcijalni ispit/II test/ II provjera znanja / od 0 do 20 bodova (%). Ukupan broj bodova (%) koji studenta prema navedenom praćenju u toku nastave može ostvariti iznosi maksimalno 55 bodova (%). Završni ispit iznosi najviše 45 bodova odnosno 45 (%). Završni ispit se organizuje iz cjelokupnog pređenog gradiva u toku nastave.
Literatura:	Obavezna: 1. Ahmić, A.; Klisura, F.: Dijagnostika i održavanje cestovnih vozila, Univerzitet u Sarajevu - Fakultet za saobraćaj i komunikacije, Sarajevo 2021.

Šifra predmeta: 30-31-2TRTES010306	**Naziv predmeta:** JAVNI GRADSKI PREVOZ		
Ciklus: I	**Godina: III**	**Semestar: VI**	**Broj ECTS kredita:** 6
Status: Izborni predmet		**Ukupan broj sati: 90**	
Učesnici u nastavi:	Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet		
Preduslov za upis:	NE		
Cilj (ciljevi) predmeta:	Sticanje edukacijskih oblika u realizaciji programa iz oblasti javni gradski prijevoz. Sticanje znanja i vještina iz javnog gradskog prevoza.		

Tematske jedinice: *(po potrebi plan izvođenja po sedmicama se utvrđuje uvažavajući specifičnosti organizacionih jedinica)*

R.br.	Nastavne cjeline	Broj sati (P+V+S+Sr)
1.	Razvoj javnog gradskog prijevoza	2+2+1+2
2.	Osnove javnog gradskog prevoza putnika	2+2+1+2
3.	Istraživanje i planiranje u javnom gradskom prevozu putnika	2+2+1+2
4.	Prevozni zahtjevi korisnika usluga u gradskom prevozu - potražnja	2+2+1+2
5.	Ponuda usluga u javnom gradskom prevozu	2+2+1+2
6.	Modeliranje u javnom gradskom prevozu putnika	2+2+1+2
7.	Dizajn sistema javnog gradskog prevoza putnika	2+2+1+2
8.	- struktura sistema javnog gradskog prevoza putnika	2+2+1+2
9.	- linija i mreža linija	2+2+1+2
10.	- vidovi prevoza i prevozna sredstva - red vožnje	2+2+1+2
11.	- sistem upravljanja prevozom - tarifni sistem, sistem karata, sistem naplate	2+2+1+2
12.	- informacioni sistem - izmjeritelji rada prevoznog sistema - izbor prevoznog sistema	2+2+1+2

	13. Planiranje u preduzećaima javnog gradskog prevoza putnika — 2+2+1+2 14. Organizacija preduzeća javnog gradskog prevoza putnika — 2+2+1+2 15. Ekonomski aspekti ponude usluga javnog gradskog prevoza putnika — 2+2+1+2
Ishodi učenja: (Znanje; vještine; kompetencije)	Znanje: Studenti kroz nastavni proces predavanja, vježbi i praktičan rad trebaju steći odgovarajuća znanja vezano za planiranje, organizaciju i upravljanje javnim gradskim prebozom putnika. Vještine: Izučavanje i praktična primjena, treba da osigura potreban nivo znanja za racionalnu organizaciju prevoza putnika u javnom gradskom putničkom prevozu u skladu sa saobraćajnim potrebama korisnika i interesima društvene zajednice i davaoca usluga. Kompetencije: Osposobiti studente za pravilno tretiranje, planiranje i rješavanje problematike javnog gradskog putničkog prevoza u gradovima.
Cilj održivog razvoja (SDG):	SDG4: Osigurati inkluzivno i kvalitetno obrazovanje, te promovirati mogućnosti cjeloživotnog učenja za sve ljude, svih životnih dobi SDG9: Industrija, inovacije i infrastruktura SDG11: Održivi gradovi i zajednice SDG12: Održiva potrošnja i proizvodnja SDG13: Klimatska akcija
Metode izvođenja nastave:	Predavanja, vježbe i izrada seminasrkog rada sa praktičnim osvrtom Analitički i demonstracioni pristup.
Metode provjere znanja sa strukturom ocjene:	Praćenje rada studenta se vrši dodjeljivanjem bodova za svaki oblik aktivnosti i provjere znanja u toku semestra, kao i na završnom ispitu nakon završetka semestra prema sljedećim elementima praćenja: – Domaća zadaća/seminarski rad/praktični rad/ 15 bodova (%), vrednuje se ako je položeno preko 50 % – I Parcijalni ispit/I test/I provjera znanja/35 bodova (%), vrednuje se ako je položeno preko 50 % – Završni ispit (II Parcijalni) 50 bodova (%), vrednuje se ako je položeno preko 50%. – Završni ispit (Integralni) 85 bodova (%), vrednuje se ako je položeno 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 vrednuje se sa 85 bodova (%), što sa seminarskim radom/praktičnim radom čini 100 bodova (%). Konačan uspjeh studenata 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 85-94.99 boda; c) 8 (C) - prosječan, sa primjetnim greškama, nosi 75-84,99 boda; d) 7 (D) - općenito dobar, ali sa značajnim nedostacima, nosi 65-74,99 boda; e) 6 (E) - zadovoljava minimalne uslove, nosi 55-64,99 boda; f) 5 (F, FX) - ne zadovoljava minimalne uslove, manje od 55 bodova.

Literatura:	Obavezna: 1. Mehanović, M., 2011. „Planiranje ponude usluga u gradskom prometu putnika“. Fakultet za saobraćaj i komunikacije u Sarajevu, Sarajevo. 2. Mehanović, M.: “Zadaci i primjeri iz teorije i prakse u javnom gradskom prevozu putnika”, Fakultet za saobraćaj i komunikacije, Sarajevo, 2005. 3. Banković, R.: Planiranje javnog gradskog putničkog prevoza, IRO Građevinska knjiga, Beograd, 1984. Dopunska: 1. Mehanović, M., 2017. „Planiranje u saobraćaju, prevozu i komunikacijama “. Fakultet za saobraćaj i komunikacije u Sarajevu, Sarajevo. 2. Jović J.: Planiranje saobraćaja u gradovima- praktikum Saobraćajni fakultet, Beograd, 1996. 3. Vučić, V.: Urban Public Transportation, Sistems and Technology, Prentice Hall International England, 1981. 4. HZDP Zagreb, Časopisi

Šifra predmeta: 30-31-3TRTES010306	**Naziv predmeta:** TRANSPORT I OKOLIŠ		
Ciklus: I	**Godina: III**	**Semestar: VI**	**Broj ECTS kredita:** 6
Status: Izborni predmet		**Ukupan broj sati: 90** Predavanja: 30, Vježbe: 20, Seminar: 10, Laboratorijske vježbe: 10, Praksa: 10, Terenski rad: 10.	
Učesnici u nastavi	Nastavnici i saradnici izabrani na oblast kojoj predmet pripada/predmet		
Preduslov za upis:	NE		
Cilj (ciljevi) predmeta:	Sticanje edukacijskih i praktičnih znanja u realizaciji programa iz oblasti transporta i okoliša. Sticanje znanja i vještina za adekvatno tretiranje problematike međuzavisnosti transporta i okoliša, te sposobnostima izrade praktičnih analiza i istraživanja.		
Tematske jedinice:	1. Multidimenzionalnost saobraćaja i okoliša 2. EU i BiH legislativa o zaštiti okoliša 3. Vrste i kvalitet goriva u funkciji zaštite okoliša 4. Cestovni saobraćaj i zagađenje zraka 5. Zračni saobraćaj i zagađenje zraka 6. Željeznički saobraćaj i zagađenje zraka 7. Informacijski sistem za zaštitu okoliša – CORINAIR, AE DEM 8. Zagađenje bukom i okoliš 9. Zagađenje bukom i cestovni saobraćaj, saobraćajni modeli cestovne buke 10. Zagađenje bukom i zračni saobraćaj 11. Zagađenje bukom i željeznički saobraćaj 12. Elementi i način izrade karte buke 13. Elementi izrade studija uticaja na okoliš 14. Zaštita okoliša ISO standardi 15. Vibracije od saobraćaja i uticaj na okoliš		
Ishodi učenja:	Znanje: Teorijska i praktična znanja iz oblasti uticaja transporta na okoliš.		

	Osnovni propisi, pravila, metode i postupci u oblasti procjene i analize stanja okoliša u zavisnosti od transportnih aktivnosti. Vještine: Sposobnost primjene teorijskih i praktičnih znanja iz oblasti međuzavisnosti transporta i okoliša u funkciji očuvanja i zaštite okoliša sa jedne strane, odnosno unaprijeđenja i razvoja transporta sa druge strane. Kompetencije: Sposobnosti samostalnog razumijevanja i korištenja propisa, korištenja stručne literature, primjene metoda i postupaka, mjerenja i istraživanja, izrada analiza, procjena i praktičnih rješenja, preventivnog djelovanja, te postupaka i procedura monitoringa (kvaliteta zraka i zagađenja bukom) u funkciji zaštite okoliša uz balansiran pristup unaprijđenja i razvoju transporta.
Ciljevi održivog razvoja (COR):	SDG4 – Kvalitetno obrazovanje SDG5-Rodna ravnopravnost SDG8-Dostojanstven rad i ekonomski rast SDG9- Industrija, Inovacije i Infrastruktura SDG11 – Održivi gradovi i lokalne zajednice SDG12-Održiva potrošnja i proizvodnja SDG13-Zaštita klime SDG17- Partnerstvom do ciljeva
Metode izvođenja nastave:	Usmeno iznošenje sa prezentacijom i prikazom različitih sistema i procesa iz oblasti međuzavisnosti transporta i okoliša, uz korištenje video i audio zapisa, te samostalno izlaganje pojedinih konkretnih problema uticaja transporta na okoliš na konkretnom području istraživanja. Iniciranje rasprava i diskusija o problemima iz prakse, pojedinačnih zapažanja iz različitih okruženja. Izrada samostalnih istraživanja i analiza iz oblasti međuzavisnosti transporta i okoliša u okviru laboratorije, na terenskim uslovima i drugim specifičnim uslovima proizvodnih i uslužnih procesa.
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: – Seminar 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.

<table>
<tr><td></td><td>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:
<table>
<tr><td>Obaveze studenta</td><td>Bodovi (%)</td></tr>
<tr><td>Prisutnost na predavanjima i vježbama. (obavezno je prisustvu svim oblicima nastave min. 80 % i ovo je uslov za ovjeru/potpis urednog pohađanja)</td><td>0 bodova</td></tr>
<tr><td>Seminar</td><td>15 bodova (%)</td></tr>
<tr><td>I Parcijalni ispit/Test/Provjera znanja/</td><td>35 bodova (%)</td></tr>
<tr><td>Završni ispit (II Parcijalni)</td><td>50 bodova (%)</td></tr>
<tr><td>Završni ispit (Integralni)</td><td>85 bodova (%)</td></tr>
</table></td></tr>
<tr><td>Literatura:</td><td>Obavezna

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Lindov, O., Omerhodžić, A., Transport i okoliš, Skripta zadataka, testovi za polaganje, Fakultet za saobraćaj i komunikacije Univerziteta u Sarajevu, Sarajevo, 2013.
Lindov, O., Pronello, C., Transport and environment air and noise pollution from transport activities, Politecnico di Torino, Department of Hydraulics, Transport and Civil Infrastructures, University of Sarajevo, Faculty of Traffic and Communications, University of Southampton, Department of Civil and Environmental Engineering, Transportation Research Group.
Lindov,O., Uticaj cestovnih vozila i cestovne infrastrukture na ekološke parametre, referat na međunarodnom skupu pod naslovom “Ekološki problemi suvremenog saobraćaja”, ANU BiH, 2006.godine.

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Lindov, O,. Noise modeling and vibrations, „I Transversal, South Longitudinal and XII Transverzal“ Fakultet za saobraćaj i komunikacije Univerziteta u Sarajevu, Sarajevo, 2010.
Lindov, O., Čekić, Š., Studija saobraćaja na području Kantona Sarajevo, Fakultet za saobraćaj i komunikacije Univerziteta u Sarajevu, Sarajevo 2005.
Lindov, O., Čaušević, S.,Studija Uticaj saobraćaja na okoliš na području Zeničko – dobojskog kantona, Fakultet za saobraćaj i komunikacije Univerziteta u Sarajevu, Sarajevo, 2009.
Lindov, O., Sigurnost u cestovnom saobraćaju, Fakultet za saobraćaj i komunikacije Univerziteta u Sarajevu, Sarajevo, 2008.
</td></tr>
</table>

	8. Lindov, O., Kazivanja o saobraćaju – Hronologija odabranih kazivanja u medijima 2002-2012, Institut za saobraćaj i komunikacije, Udruženje inžinjera u Bosni i Hercegovini, Sarajevo, 2013.

Opis silabusa na studijskom programu Cestovni saobraćaj na engleskom jeziku

Course code: 01ATCOS010101	**Course title:** MATHEMATICS FOR ENGINEERS I		
Level: I	**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 (Exercises) 45	
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 basic knowledge for continuing to follow higher-level mathematical disciplines that appear in the subjects: Mathematics for Engineering II and Applied Mathematics and Statistics, and in this way create prerequisites for applying mathematical tools in monitoring, understanding and studying phenomena that appear in professional subjects in the field traffic and communication.		
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Mathematical logic: Logical operations with statements. Relations, sets and mappings. 2. Sets of real and complex numbers: Natural numbers. Mathematical induction. Newton's binomial formula. Different forms of complex number 3. Linear algebra: Concept of matrix. Operations with matrices. The term determinant. Systems of linear equations: Gauss's method of elimination, Kramer's rule and Kronecker-Kapeli's theorem. 4. Linear algebra: Vector algebra. Operations with vectors. Scalar product. Vector product. Mixed product. 5. Analytical geometry of space: Plane in space. Rights in space. Distance of a point from a line. Mutual relationship of two lines in space. Interrelationship between line and plane. 6. Sequences and rows: Limes sequence. Convergence criterion. Monotonic sequences. An infinite queue. 7. Functions of a real variable: Properties of functions of one variable. Limit value of functions of one variable. 8. Differential calculus of functions of one variable: Continuity of functions. Elementary functions 9. Differential calculus of functions of one variable: The concept of derivatives of functions of one variable. The geometric meaning of the		

	derivative. The mechanical meaning of the derivative. 10. Differential calculus of functions of one variable: Differentiability and differential of functions. Derivatives and differentials of higher order. Differentiation rules. 11. Differential calculus of functions of one variable: Application of differential calculus. Rolle's, Cauchy's and Lagrange's theorems. L'Hospital's rule. Taylor's formula. Maclaurin's formula. 12. Examining the functions of a real variable: Monotonicity of functions. Determination of local extreme values. Convexity, concavity and inflection points of functions. Flow test. Graphing functions. 13. Indefinite integral: Primitive function and indefinite integral. Properties of the indefinite integral. Integration rules. Integration methods. 14. Definite integral: Properties of the definite integral. Newton – Leibniz formula. Improper integral 15. Application of the definite integral in geometry: Application of the definite integral to the calculation of the area of a plane figure, the length of the arc of a curve in a plane, the volume of a body and the area of revolving surfaces.
Learning outcomes:	Knowledge: • solve and apply systems of linear equations, • define and solve problems described by vectors, applying operations with vectors, • demonstrate an understanding of the basic concepts of analysis: limit values, differentiation and integration of real functions with one real variable, • apply differentiation procedures in solving the problem of extremes, • draw graphs of functions based on the application of the first and second derivative for its analysis, • define and calculate the indefinite integral using the substitution and partial integration methods, • understand and apply procedures for integration of rational functions, use integration to calculate area and volume. Skills: encourages creativity, precision, systematicity, abstract thinking and critical thinking, which helps in noticing and solving problems, which is essential for continuing education. Competences: presentation and communication in mathematical language, logical thinking, argumentation and reasoning
Sustainable Development Goal (SDG):	SDG 4 – Quality education SDG 9 – Industry, innovation and infrastructure
Teaching methods:	Theoretical lectures with the use of multimedia tools, active learning and discussion techniques, practical teaching - exercises, and independent presentation and solving of specific specific problems.
Assessment methods with grading structure:	The criterion for evaluating the work and evaluating the student during classes is as follows: Tests during the semester from 0 - 15 points; 1st partial exam/1st test/1st knowledge test/ from 0 - 35 points (passed if more than 50% is won). The total number of points that a student can achieve according to the above-mentioned monitoring during classes is a maximum of 50 points. The final exam is organized from the entire material covered during the course and amounts to a maximum of 50

	points, of which there is the II partial exam of 0 - 25 points (passed if over 50%) and Theory and tasks of 0 - 25 points, which lasts 60 min (students pass the theory and tasks they did not do in the partial exams). At the final exam, students can correct the I partial exam, if they did not pass it earlier. The same applies to the remedial exam period of the final exam and both dates of the autumn exam period. 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 (A) - exceptional success without mistakes or with minor mistakes, carries 95-100 points; b) 9 (B) - above average, with some errors, carries 85-94.9 points; c) 8 (C) - average, with noticeable errors, carries 75-84.9 points; d) 7 (D) - generally good, but with significant shortcomings, carries 65-74.9 points; e) 6 (E) - meets the minimum requirements, carries 55-64.9 points; f) 5 (F, FX) - does not meet the minimum conditions, 0 – 54.9 points. 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 and passing the partial and final exam, and according to the quality of acquired knowledge and skills, and contains a maximum of 100 points, and is determined according to the following scale: Student obligations Points (%) Mini-tests during classes.....15 points (%) I Partial exam/Test/Knowledge check/.....35 points (%) Final exam (II Partial + Theory) .....50 points (%)
Literature:	Mandatory: 1. M. Uščumlić, P.Miličić, Zbirka zadataka iz više matematike I, Naučna knjiga, Beograd 2. Kostić, V. Hadžiabdić, M. Mehuljić, J. Bektešević, Matematika I – teorija sa urađenim zadacima, Mašinski fakultet Sarajevo, 2011. ISBN 978-9958-601-32-3. 3. Alma Omerspahić, Vahidin Hadžiabdić, Midhat Mehuljić, Jasmin Bektešević, Teorijske osnove i zbirka zadataka iz integralnog računa, Mašinski fakultet Sarajevo, 2012. Supplementary: 1. P. JAVOR: Matematička analiza I, Element, Zagreb,1996. 2. S. KUREPA: Matematička analiza 1 i 2, Tehnička knjiga, Zagreb, 1972.

Course code: 02ATCOS010101	**Course title:** ENGINEERING GRAPHICS		
Level: I	**Year: I**	**Semester: I**	**Number of ECTS credits: 6**
Status: Mandatory Course		**Total number of contact hours: 90** Lectures: 60 Tutorials: 30	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course**		
Prerequisite for enrollment:	No		

Course goal (goals):	Training students for universal engineering communication, communicating with drawings, introducing students to the basics of technical drawing and design geometry, as well as the content and application of standards in the field of graphic communications and technical documentation. Training students to read and understand technical drawings and various technical situations, with special reference to traffic situations. Training students to create technical drawings using computer tools.
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Introduction – significance and application of graphic communications in technology. 2. Practical examples of drawings in the field of traffic and communications. 3. Computer programs and CAD systems in the field of traffic and communications. 4. Standardization in graphic communications. 5. Technical drawings, types of drawings, methods of their formation, drawing formats, headers and components. 6. Technical fonts and technical freehand sketching. 7. Types of lines and their use. 8. Construction of curved lines and circular arcs. 9. Scale. 10. Drawings of parts and situations on drawings with the basics of drawing geometry. 11. Projecting. Types of projections, axonometric projection, isometry, dimetry and oblique projection. 12. Orthogonal projection. 13. Sections, types of sections and hatching. 14. Dimensioning. 15. Drawing of basic standard elements in the field of traffic and communications. 16. Computer-aided creation of 3D models and technical documentation of products and situations. 17. Use and introduction of CAD systems in engineering practice. 18. Historical development of the CAD systems. 19. Basics of CAD system. 20. Principles of CAD system operation. 21. The difference between 2D and 3D CAD systems. 22. Basics of application of GIS (geographical information system) systems in the field of traffic and communications.
Learning outcomes:	Knowledge: Developing the ability to independently set up and solve simpler problems in the aforementioned areas. Adopts an engineering approach to problem solving. Skills: Ability to apply theoretical and practical knowledge in the field of engineering graphics. Competencies: Through the curriculum and examples from real situations, students should be able to present ideas graphically, as well as a universal, unambiguous understanding of technical documentation with the application of standard elements of graphic communication.
Sustainable Development Goal (SDG):	GOAL 4 - Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

	GOAL 9 - Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
Teaching methods:	Oral presentation with presentations and display of various problems with the use of certain didactic tools. Independent work of students on concrete problems in the field of engineering graphics.
Assessment methods with grading structure:	Criterion of student's progress and evaluation during classes and through partial, final and remedial exams. According to the following method: - Regular attendance at lectures and exercises ….. 10 points, - Project assignments ……. 25 points, - I Partial exam/test/knowledge check/ …… 30 points, - II Partial exam/test/knowledge check/ …….. 35 points. The total number of points that a student can achieve according to the above-mentioned monitoring during classes is a maximum of 100 points (%). Student is passed if he/she collects a minimum of 55 points according to the above criteria. The final and remedial exam is organized for students who have not passed first, second or both knowledge tests. A maximum of 60 points can be scored on the final and remedial exam, which with project assignments and points based on class attendance makes a total of 100 points. The final success of the student, after all the foreseen forms of knowledge testing, is evaluated and graded by the grading system as follows: 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 errors, 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. 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 and passing the partial and final exam, and according to the quality of acquired knowledge and skills, and contains a maximum of 100 points, and is determined according to the following scale: Student obligations Points Attendance at lectures and exercises... ..... 10 points (minimum 80% attendance in all forms of classes is mandatory and this is a condition for certification/signature of regular attendance) Project tasks ....……. 25 points I Partial exam/Test/Knowledge check/..... 30 points II Partial exam/Test/Knowledge check/..... 35 points Final exam (I and/or II partial) ..... 60 points

	Remedial exam (I and/or II partial) ..... 60 points
Literature:	Mandatory: 1. Milan Kljajin and Milan Opalić: Engineering graphics, Faculty of Mechanical Engineering in Slavonski Brod, 2020. Additional: 1. Samir Lemeš: Computer graphics and geometric modeling, Zenica, 2017.

Course code: 03ATCOS010101	**Course title:** BASICS OF TRAFFIC AND COMMUNICATION SYSTEMS		
Level: I	**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 60 Tutorials 30	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course**		
Prerequisite for enrollment:	None.		
Course goal (goals):	Acquisition of knowledge and skills necessary for understanding the structure and functions of transport, traffic and communication systems. Acquisition of basic knowledge about transport, traffic and communication processes, their development and management.		
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Concept and significance of traffic and communication system 2. Basic characteristics of the transport substrate 3. Transport devices 4. Manipulation means and transport equipment 5. Man as a component of traffic and transport system 6. Basic concept and functions of transport modes 7. Capacity and service level of the transport system 8. Basic characteristics and challenges of mobility 9. Mode of road transport 10. Mode of rail transport 11. Mode of air transport 12. Mode of water transport 13. Mode of pipeline transport 14. Postal and communication technologies 15. Information and communication technologies in transport		
Learning outcomes:	Knowledge: The subject Basics of traffic and communication systems should provide the necessary level of knowledge about the basic components and functions of transport, traffic and communication systems and the specific characteristics of individual modes of transport and the way transport and communication processes unfold. Skills: The course Basics of traffic and communication systems enables the acquisition of skills necessary for measuring, analyzing and evaluating the efficiency, safety, environmental impact and economic benefits of the transport system and individual modes of transport.		

	Competences: Through the teaching process of lectures, exercises, and seminar work, students should acquire appropriate competencies for analyzing the functions and characteristics of components of the transport and communication system and the possibility of using different modes of transport in order to take advantage of the advantages of each mode of transport.
Sustainable Development Goal (SDG):	"SDG3 - Health and well-being"; "SDG 9 Industry, innovation and infrastructure", "SDG11- Sustainable cities and communities", SDG 13- Climate protection"
Teaching methods:	Lectures, exercises and seminar work.
Assessment methods with grading structure:	1. Attendance at classes and semester work 15 points 2. First knowledge test 35 points 3. Final knowledge test 50 points
Literature:	Mandatory: 1. Teaching material available on the online platform for study of the Faculty of Traffic and Communications Supplementary: 1. Bert van Wee, Jan Anne Annema: The Transport System and Transport Policy, Edward Elgar, Massachusett s, 2013. 2. Milan Janić : Advanced Transport Systems, Springer, London, 2014. 3. Mehrdad Ehsani, Fei-Yue Wang: Transportation Technologies for Sustainability, Springer, London, 2012.

Course code: 04ATCOS010101	**Course title:** COMPUTER SCIENCE AND INFORMATICS		
Level: I	**Year: I**	**Semester: I**	**Number of ECTS credits: 6**
Status: Mandatory Course		**Total number of contact hours: 90** Lectures 60 Tutorials 30	
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 Computer Science and Informatics course is to acquire knowledge and master skills that contribute to the development of information literacy necessary for further study. Students should familiarize themselves with the basic characteristics of computers, the way they work and their capabilities, i.e. achieve an understanding of the architecture of computer systems, operating systems and application software.		
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Introduction to computing and informatics 2. Basic terms in computer science and computer science and computer development 3. Number systems and codes in computing 4. Computer architecture and components 5. Data storage devices 6. Operating systems 7. Application software		

	8. Computer networks and services 9. Wireless and mobile networks 10. Network multimedia services 11. Tools for creating web pages 12. Programming languages for software development 13. Databases 14. Cryptocurrencies 15. Artificial intelligence 16. Security in computing and informatics 17. The future in computing and informatics
Learning outcomes:	Knowledge: Students will acquire theoretical and practical knowledge about computing and informatics, and will be provided with a basic level of knowledge about hardware and software, as well as their application in various fields of traffic and communications. Skills: Students are expected to master the skills and tools used in computing and informatics. Competencies: Students will be trained to participate in activities related to computing and informatics in the context of traffic and communications.
Sustainable Development Goal (SDG):	SDG 4 – Quality education SDR 9 – Industry, innovation and infrastructure
Teaching methods:	The teaching is realized through lectures, exercises and the practical part of the teaching, which includes the creation of seminar papers. Lectures are carried out through oral presentation with presentation and presentation of examples from practice, and initiation of discussion. 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 by applying 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 obtain 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 obtained 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 assignment:..... 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.
Literature:	Mandatory: 1. Milosavljević, M., Veinović, M., Grubor, G.: „Informatika“, Univerzitet Singidunum, Beograd, 2009. 2. Kozić, M.: „Uvod u informatiku i računarstvo“, Mostar, 2006. 3. Baraković, S., Baraković Husić, J.: „Osnove modelovanja prijetnji u oblasti informaciono-komunikacijskih sistema“, Dobra knjiga, 2022. Supplementary: 1. Plazibat, B., Jerčić, S.: „Informatika“, Veleučilište u Splitu, Split, 2005. 2. Tanenbaum, A.S.: "Structured Computer Organization", 4 izdanje, Prentice Hall, 1999. 3. Mark Burel, „Fundamentals of Computer Architecture“, Palgrave Macmillan, 2003. 4. Hennessy J. L., Patterson D. J.: "Computer Architecture: A Quantitative Approach", Morgan Kaufman. 5. Tanenbaum, A.S.: „Računarske mreže“, prevod četvrtog izdanja, Mikro knjiga, 2005.

Course code:	**Course title:**
05ATCOS010101	ELECTRICAL ENGINEERING SYSTEMS IN TRAFFIC AND COMMUNICATIONS

Level: I	**Year: I**	**Semester: I**	**Number of ECTS credites:** 6
Status: Mandatory Course		**Total number of contact hours: 90** Optional breakdown of hours by type: Lectures 45 Tutorials 30 Laboratory tutorials 15	
Course participants:	Academic staff and associates selected in the field to which the course belongs/course		
Prerequisite for enrollment:	No		
Course goal (goals):	The course aims to present students with the fundamental concepts of electrical systems in transport and communications, and their treatment through mathematical terms. Basic concepts of phenomena in electrical engineering, essential for the foundational training of future transport and communications engineers, will be covered. Students are expected to acquire knowledge related to scientific methodology and natural laws, allowing them to approach phenomena in electrical engineering from both qualitative and quantitative perspectives.		
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Electric Charge and Matter: Coulomb's law of force, distribution of electric charges. Electric field: definition, calculation examples. Gauss's theorem for the electric field in integral form. Electric potential: work of electric field forces, conservative nature of the electric field. Potential and potential difference, principle of superposition when calculating potential. Electric capacitance: system of charged conductors, isolated conductor. Definition of electric capacitance, calculation examples of capacitance. Capacitor connections. Electrostatic energy. Behavior and application of capacitors in direct and alternating current circuits. Dielectrics and material polarization. 2. Direct Current Electrical Circuits: Definition of electrical conductivity and steady electric currents, Ohm's law, electrical conductivity, electrical resistance, specific electrical resistance, series and parallel resistors. Joule's law. Energy exchange in an electric circuit. Kirchhoff's laws. The law of energy conservation in an electrical circuit. Methods of analysis for direct current electrical circuits. 3. Magnetic Field: Magnetic interaction, electricity and magnetism. Magnetic force on a moving electric charge, magnetic force on a current-carrying conductor. Sources of the magnetic field, Ampere’s law in its basic form, magnetic properties of materials: magnetic field generated by current, Biot–Savart law, electrodynamic force, magnetic properties of materials. Time-varying electric and magnetic fields: characteristics of the electromagnetic field, Faraday's law of electromagnetic induction, Lenz's principle, induced electromotive force. Application of Faraday's law: alternating current generators, electric motors. Self-induction, inductive electric circuit. 4. Electrical Circuits with Time-Varying Currents and Lumped Parameters: Basic electrical quantities: voltage, current, power.		

	Kirchhoff's laws. Two-pole elements: resistor, current and voltage sources, short circuit and open circuit. Series and parallel connections. Basic dynamic circuits: inductors and capacitors: energy and initial conditions. First-order circuits (RC and RL) connected to direct current voltage. 5. Circuits in Steady-State Sinusoidal Operation: Periodic signals and effective value. Relationship between sinusoidal signals and phasors. Kirchhoff's laws in phasor representation. Impedance, admittance, reactance, and susceptance of two-pole elements in sinusoidal operation. Analysis of dynamic circuits in sinusoidal operation (RC, RL, and RLC). Active, reactive, and apparent power. 6. Three-Phase Systems: Delta and star connections, symmetric and asymmetric operation. Three-phase rotating field, principle of electric motor operation. 7. Transformers: Principle of operation, linear transformer. Basics of operation of commutator and asynchronous electric machines: principles and energy balance of electromechanical energy conversion. 8. Basic Measurements of Electrical Quantities: Basics of measurement techniques and error calculation. Basic measuring equipment. Analog and digital measuring instruments. Methods for measuring electrical quantities. 9. Analog Electronics: Electrical properties of semiconductors, electrons and holes. Donors and acceptors. Characteristics of the p-n junction: Open p-n junction. Diode (p-n junction) as a rectifier. Forward-biased p-n junction. Reverse-biased p-n junction. Static characteristic of the diode. Application of the diode's linear model. Principle of transistor operation. Transistor currents. Common-emitter configuration. Transistor operating regions. 10. Fundamentals of Digital Technology: Boolean algebra. Basic logic gates. Basic connections of AD and DA converters.
Learning outcomes: (Knowledge; Skills; Competencies)	Knowledge: Theoretical and practical knowledge in the field of electrical systems in transport and communications. Fundamental principles of electrical engineering and electronics, and their application in engineering. Skills: Upon successful completion of the course, the student will be able to apply the basic principles of electrical systems in their further studies. Competencies: The student will be capable of analyzing and proposing potential models and methods for solving problems in electrical systems.
Sustainable Development Goal (SDG):	SDG 4 – Quality Education; SDG 12 – Sustainable Consumption and Production
Teaching methods:	The course content is delivered through three activities: 1. Lectures: Conducted in the classroom for all students by the instructor, where theoretical aspects are presented along with the solving of numerical problems and practical examples. The lectures are supported by the use of video and audio recordings. 2. Exercises: These sessions involve solving additional numerical and practical problems, including solving past exam problems to

<table>
<tr><td></td><td>enhance the understanding of the theoretical topics presented.
3. Laboratory Exercises: Students are introduced to practical measurements and the use of measurement equipment to demonstrate specific principles in the field of electrical engineering.
Students are therefore expected to regularly participate in all forms of instruction and engage in continuous independent study.</td></tr>
<tr><td>Assessment methods with grading structure:</td><td>Criteria for Monitoring and Grading Student Performance During the Course are structured as follows:
• Homework/Seminar Paper: 15 points (15%), passing with more than 50% of the points.
• First Midterm Exam/Knowledge Check: 35 points (35%), passing with more than 50% of the points.
• Final Exam: 50 points (50%), consisting of two parts:
o Second Midterm Exam/Knowledge Check: 35 points (35%), passing with more than 50% of the points.
o Oral Exam: 15 points (15%), with no minimum point threshold.

The total number of points a student can earn during the course is a maximum of 50 points (50%), combined with the Final Exam to reach 100 points (100%).

For students who did not pass the First Midterm Exam, the Final Exam (Comprehensive) covers the entire content taught during lectures and exercises and is worth 85 points (85%), which, combined with the seminar paper/practical work, makes up 100 points (100%).

The final grade is determined based on the total number of points obtained through all forms of assessment, using the following grading scale:
• A (10) – Outstanding performance with no or minimal errors, 95-100 points;
• B (9) – Above average, with minor 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) – Satisfactory, meets minimum criteria, 55-64 points;
• F/FX (5) – Fails to meet minimum criteria, fewer than 55 points.
Total evaluation of all student obligations during the semester and the final exam is based on the total points (%) obtained through fulfilling pre-exam obligations and passing the midterm and final exams, with a maximum of 100 points. The evaluation is determined according to the following scale:
<table><tr><td>Student Obligations</td><td>Points (%)</td></tr><tr><td>Homework/Seminar Paper</td><td>15 points (%)</td></tr><tr><td>First Midterm Exam/Knowledge Check</td><td>35 points (%)</td></tr><tr><td>Final Exam (Second Midterm/Oral Exam)</td><td>50 points (%)</td></tr><tr><td>Final Exam (Comprehensive)</td><td>85 points (%)</td></tr></table></td></tr>
<tr><td>Literature:</td><td>Required:
1. I. Turković: Bilješke i slajdovi sa predavanja i vježbi</td></tr>
</table>

	2. E. Hot: Osnovi elektrotehnike, knjiga prva, Sarajevo, 1996. 3. E. Hot: Osnovi elektrotehnike, knjiga druga, Sarajevo, 1996. 4. D Milatović: Osnovi elektronike, Svjetlost, Sarajevo 1995.

Course code: 06ATCOS010102	**Course title:** MATHEMATICS FOR ENGINEERS II		
Level: I	**Year: I**	**Semester: II**	**Number of ECTS credits:** 6
Status: Mandatory Course		**Total number of contact hours: 90** Optional breakdown of hours by type: Lectures 45 Exercises 45	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course**		
Prerequisite for enrollment:	No		
Course goal (goals):	Students upgrade basic knowledge with mathematical thematic units of a higher level of understanding. In this way, students become trained to recognize the application of this general knowledge to concrete practical problems (which arise from the field of professional subjects), and to independently define and solve them.		
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Functions of several variables: Basic terms. Limit value and continuity 2. Differential calculus of functions of several variables: Differentiation. Tangent plane and normal to the spatial surface. Higher order pracial derivative. Higher order differential. Taylor's formula for functions of two variables 3. Differential calculus of functions of several variables: Extreme values of functions of several variables. Conditional extremum of a function of several variables. 4. Integral calculus of functions of several variables: Calculation of the double integral. Calculation of the triple integral. 5. Differential equations: Differential equations of the first order: Differential equation with a separated variable. Homogeneous equation. Linear differential equation. Bernoulli's equation. Riccati's equation. Kler's equation. Lagrange's equation. 6. Differential equations: Differential equations of a higher order that allow lowering of the order. Higher order linear differential equations. 7. Differential equations. Systems of differential equations. 8. Line integrals: Line integrals of type I and II (definition, properties, calculation). Independence of the line integral from the path. Green's formula in the plane. 9. Surface integrals: Surface integrals of type I and II (definition, properties, calculation). Gauss-Ostrogradsky formula. Stokes formula. 10. Elements of field theory and vector analysis: Scalar field and its basic characteristics. Vector field and its basic characteristics. Vector lines. 11. Elements of field theory and vector analysis: Divergence of a vector field. Green – Gauss-Ostrogradski theorem. Circulation of the vector field. Vector field rotor. Stokes theorem in vector form. Potential field, solidoid field, Laplace field.		

	12. Theory of queues: Number queues. Rows with positive members. Queues with complex members. 13. Series theory: Series and series of functions. Uniform convergence of the order. Degree order. 14. Series theory: Laurent's series. Fourier's order. 15. Laplace transformation.
Learning outcomes:	Knowledge: - Students master the differential calculus of functions of several variables, - set up and solve differential equations and apply them to specific problems, - solve and apply systems of differential equations, - apply differentiation procedures in solving the problem of extrema of multi-variable functions, - define and calculate double, triple, line and surface integrals with the possibility of recognizing their application to specific problems, - demonstrate an understanding of the basic concepts of vector analysis Skills: encourages creativity, precision, systematicity, abstract thinking and critical thinking, which helps in noticing and solving problems, which is essential for continuing education. Competences: presentation and communication in mathematical language, logical thinking, argumentation and reasoning.
Sustainable Development Goal (SDG):	SDG 4 – Quality education SDR 9 – Industry, innovation and infrastructure
Teaching methods:	Theoretical lectures with the use of multimedia tools, active learning and discussion techniques, practical teaching - exercises, and independent presentation and solving of specific specific problems.
Assessment methods with grading structure:	The criterion for evaluating the work and evaluating the student during classes is as follows: Tests during the semester 0 - 15 points; 1st partial exam/1st test/1st knowledge test/ from 0 - 35 points (passed if more than 50% is won). The total number of points that a student can achieve according to the above-mentioned monitoring during classes is a maximum of 50 points. The final exam is organized from the entire material covered during the course and amounts to a maximum of 50 points, of which there is the II partial exam of 0 - 25 points (passed if over 50%) and Theory and tasks of 0 - 25 points, which lasts 60 minutes (students pass the theory and tasks they did not do in the partial exams). At the final exam, students can correct the I partial exam, if they did not pass it earlier. The same applies to the remedial exam period of the final exam and both dates of the autumn exam period. 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 (A) - exceptional success without mistakes or with minor mistakes, carries 95-100 points; b) 9 (B) - above average, with some errors, carries 85-94.9 points; c) 8 (C) - average, with noticeable errors, carries 75-84.9 points; d) 7 (D) - generally good, but with significant shortcomings, carries 65-74.9 points; e) 6 (E) - meets the minimum requirements, carries 55-64.9 points; f) 5 (F, FX) - does not meet the minimum conditions, 0 – 54.9 points.

	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 and passing the partial and final exam, and according to the quality of acquired knowledge and skills, and contains a maximum of 100 points, and is determined according to the following scale: Student obligations Points (%) Mini-tests during classes.....15 points (%) I Partial exam/Test/Knowledge check/.....35 points (%) Final exam (II Partial + Theory) .....50 points (%)
Literature:	Mandatory: 1. J. Bektešević, V. Hadžiabdić, M. Mehuljić, E. Pilav Teorijske osnove i zbirka riješenih zadataka iz višestrukih, krivolinijskih i površinskih integrala, PMF, Sarajevo 2018. 2. P. Miličić, M. Uščumlić, Zbirka zadataka iz više matematike II, Nauka, Beograd, 1998 3. A.Omerspahić, V.Hadžiabdić, M.Mehuljić, J.Bektešević, Teorijske osnove i zbirka zadataka iz integralnog računa, Mašinski fakultet Sarajevo, Sarajevo 2012. 4. D. Mihailović, D. Đ. Tošić, Elementi matematičke analize II, (Funkcije više promjenljivih, 5. vektorska analiza, višestruki integrali i teorija polja), Naučna knjiga, Beograd, 1976; 1988; 1991. 6. B.P. Demidovič: Zadaci I riješeni primjeri iz više matematike s primjenom na tehničke nauke, Tehnička knjiga, Zagreb, 1963 Supplementary: 1. S. Kurepa: Matematička analiza 2 i 3, Tehnička knjiga, Zagreb, 1976. 2. A.Omerspahić, Matematika 3, Mašinski fakultet Sarajevo, Sarajevo 2012.

Course code: 07ATCOS010102	**Course title:** TECHNICAL MECHANICS		
Level: I	**Year: I**	**Semester: II**	**Number of ECTS credits: 6**
Status: Mandatory Course		**Total number of contact hours: 90** Lectures 45 Exercises 45	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course**		
Prerequisite for enrollment:	No		
Course goal (goals):	Adoption of basic concepts and laws: Statics of rigid and solid bodies, Kinematics and Dynamics with the aim of training for successful monitoring and acquisition of knowledge from other professional subjects. Understanding of mechanical processes and application of acquired knowledge when solving problems related to the equilibrium conditions		

	of rigid bodies, stress analysis and dimensioning of solid bodies, solving problems related to the geometry and kinematic characteristics of motion as well as problems that consider the causes of motion. Developing the ability to independently set up and solve simpler problems in the aforementioned areas. Adopts an engineering approach to problem-solving.
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Introduction. Statics of rigid bodies. Connections and Connection Reactions. 2. Systems of interface forces. A static moment of force for a point. Coupling of forces 3. Reduction of force to a point. An arbitrary system of forces in a plane. 4. Beam supports in a plane 5. Friction. Center of gravity 6. Introduction to material resistance. External forces. Strain. Deformations 7. The relationship between stress and strain. Axial stress. 8. Shearing. Geometric characteristics of plane sections. 9. Bending. Twisting. 10. Introduction to kinematics. Kinematics of a particle. Straight-line harmonic oscillatory clipping. 11. Rigid body kinematics. Translational movement. 12. Rotation of the body around a fixed axis. Analysis of mechanisms 13. Introduction to dynamics. Laws of dynamics. Differential equations of motion of a point and their integration. 14. General laws of point dynamics Work and power 15. Forced motion of a point and Dalamber's principle, Impact theory
Learning outcomes:	Knowledge: Knowledge of basic terms and laws, such as statics of rigid and solid bodies, Kinematics and Dynamics. Skills: Ability to recognize problems related to equilibrium conditions of rigid bodies, stress analysis and dimensioning of solid bodies, solving problems related to geometry and kinematic characteristics of motion as well as problems that censider the causes of motion. Ability recognition basic characteristic scientific research and transmission conclusions and reasons which are up to them brought. Competencies: Through educational process lectures and exercises, the student will be able, at basis adopt knowledge that: – Understands and points out the causes that lead to changes in the state of rest and mechanical movement of the body in nature, to determine the kinematic and dynamic characteristics of movement. – Follows and acquires knowledge from other professional subjects. – Uses technical literature, manuals and tables from this field. – Independently set and solve simple problems in the mentioned areas
Sustainable Development Goal (SDG):	SGD4 – Quality educations; SDG12 – Responsible consumption and production
Teaching methods:	– Independent presentation – Discussion – Analysis of examples from practice (assignments, seminar papers)
Assessment methods with	Assessment of creativity in classes and exercises with the creation of

grading structure:	independent works, assessment of the partial test during the class as well as the assessment of the final exam. Criterion monitoring the work and evaluating the student during classes, according to the following method: – Homework/seminar work/practical work/ 15 points (%), passed if over 55% is won. – I Partial exam/test/knowledge check/35 points (%), passed if more than 55% is won. – Final exam (II Partial) 50 points (%), passed if over 55% is won. – Final exam (Integral) 85 points (%), passed if more than 55% is won. The total number of points (%) that a student can achieve according to the mentioned monitoring during classes is a maximum of 50 points (%), which with the Final (II partial) 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 testing, is evaluated and graded by the grading system as follows: 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 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. 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 pre-exam obligations and passing the partial and final exam, and according to the quality of acquired knowledge and skills, and contains a maximum of 100 points, and is determined according to the following scale: Student obligations _____Points (%) Attendance at lectures and exercises.....80 (%) Assignment/Seminar/Practice/.....15 points (%) I Partial exam/Test/Knowledge check/.....35 points (%) Final exam (II Partial) .....50 points (%) Final exam (Integral) .....85 points (%)
Literature:	Mandatory: 1. Dacić, S.: Mechanics in Traffic Engineering, Faculty of Traffic and Communications, Sarajevo, 2021. 2. Dacić, S.: Fundamentals of Mechanical Engineering, Faculty of Traffic and Communications, Sarajevo, 2007. 3. Dacić, S.: Selected chapters from the statics of rigid and solid bodies, kinematics and dynamics - script, Faculty of Traffic and Communications, Sarajevo, 2013.

	4. Jurum-Kipke, J.: Mechanics in Traffic Engineering, Faculty of Traffic Sciences, Zagreb, 2001. 5. Kuzmanović, D., Kastratović, G., Vidanović, N.: Mechanics 1, University of Belgrade, Faculty of Communication, 2012. 6. Kuzmanović, D., Kastratović, G., Vidanović, N.: Mechanics 2, University of Belgrade, Faculty of Civil Engineering, 2012. Supplementary: 1. Rusov, L. Mechanics - Statics, Scientific book, Belgrade, 1992. 2. Rusov, L. Mechanics - Kinematics, Scientific book, Belgrade, 1992 3. Rusov, L. Mechanics - Dynamics, Scientific book, Belgrade, 1992 4. Beer, F., E. Russell, L., J. Kornwell. P., Vector Mechanics for Engineers, McGraw Hill, 2010. 5. Kuzmanović, D., Kastratović, G., Vidanović, N.: Collection of tasks from Mechanics 1, University of Belgrade, Faculty of Civil Engineering, 2012.

Course code: 08ATCOS010102	**Course title:** TRAFFIC AND TRAFFIC SPACE		
Level: I	**Year: I**	**Semester: II**	**Number of ECTS credites: 6**
Status: Mandatory Course		**Total number of contact hours: 90** Optional breakdown of hours by type: Lectures 60 Tutorials 30	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course**		
Prerequisite for enrollment:	None		
Course goal (goals):	Acquisition of educational knowledge in the field of traffic planning and practical analysis of urban, regional, and environmental traffic planning. Gaining knowledge in the area of planned management, land use, spatial protection, defining long-term goals, and measures for spatial development in accordance with the planned overall economic, social, and historical development of the space being addressed.		
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Introduction – Basics of Spatial Planning 2. Basic Characteristics of Environmental Issues 3. Measuring the Level of Social Development 4. Spatial Organization 5. Development of Spatial Planning and Spatial Organization in Bosnia and Herzegovina 6. Environmental Impact Assessment 7. Legal Framework for Spatial Planning 8. Trends in Development and New Approaches to Spatial Planning 9. Work Marketing 10. Elements of Sustainable Development 11. Spatial Models 12. Local Initiatives and Strategic Plans at the Local LevelNew Dimensions of European Policy in Spatial Planning 13. Spatial Outcomes Significant for Europe 14. Digital Technology in Spatial Planning		

Learning outcomes: (Knowledge; Skills; Competencies)	Knowledge: Theoretical and practical knowledge in the field of traffic spatial planning. Basic regulations, rules, methods, and procedures in the area of spatial planning within the context of traffic planning, as well as the analysis of traffic spatial plans. Skills: Ability to apply theoretical and practical knowledge in the field of traffic spatial planning. Competencies: Capabilities for independent understanding and application of regulations, use of technical literature, implementation of methods and procedures, measurement and research, preparation of analyses, assessments, and practical solutions for the realization and further improvement of traffic spatial planning.
Sustainable Development Goal (SDG):	SDG 3 – Good Health and Well-being SDG 9 – Industry, Innovation, and Infrastructure SDG 11 – Sustainable Cities and Communities SDG 13 – Climate Action
Teaching methods:	Verbal presentation with visuals and demonstrations of various systems and processes in the field of traffic spatial planning, utilizing video and audio recordings, as well as independent presentations of specific problems within the area of research. Initiating discussions and debates on practical issues, individual observations from different contexts, conducting independent research, and analyzing existing traffic spatial plans for the selected area.
Assessment methods with grading structure::	The evaluation of students will include the completion of independent assignments, assessment of the first partial test during the course, as well as the final exam. The criteria for monitoring and evaluating students during the course are as follows: • Seminar paper/Fieldwork/Laboratory exercises/Practical work (written and oral assessment): 15 points (%), passing if over 50% is achieved. • First Partial Exam/Test/Knowledge Assessment (written test): 35 points (%), passing if over 50% is achieved. • Final Exam (Second Partial Exam) (written test): 50 points (%), passing if over 50% is achieved. • Final Exam (Integral) (written test): 85 points (%), passing if over 50% is achieved. The total number of points (%) that a student can earn based on the aforementioned evaluations during the course is a maximum of 50 points (%), which combined with the Final Exam (Second Partial Exam) totals 100 points (%). For students who did not pass the first partial exam, the Final Exam (Integral) will be organized to cover all the material taught during the course and exercises, and will be worth 85 points (%), which along with the seminar paper/practical work makes a total of 100 points (%). Students must pass each of the following components to pass the exam: the seminar paper, the first partial exam (test), and the final exam (second partial or integral). Evaluation of the seminar paper and the first partial exam (test) will take place during the course. Students who pass the first partial exam will only take the second partial exam in the final assessment, while those who do not pass the first partial exam will take the integral exam covering both the first and second partial exams. Repeat students who did not pass the exam in the previous academic year

	and have fulfilled certain obligations and earned specific points may transfer these points to the current academic year. Repeat students wishing to transfer points must inform the course instructor at the beginning of the semester, by the end of the first week of classes. Points can only be transferred once. The final success of the student, after all forms of knowledge assessment, will be evaluated and graded according to the following grading system: • 10 (A) - exceptional performance with no errors 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 deficiencies, worth 65-74 points; • 6 (E) - meets minimum requirements, worth 55-64 points; • 5 (F, FX) - does not meet minimum requirements, less than 55 points. The overall evaluation of all student obligations during the semester, as well as the exam grade, is based on the total number of points (%) earned by the student through fulfilling pre-exam obligations and taking the partial and final exams, reflecting the quality of acquired knowledge and skills. This evaluation contains a maximum of 100 points and is determined according to the following scale: Student Obligations Points (%) Attendance in lectures and exercises ..... 0 points Attendance at all forms of instruction is mandatory, with a minimum of 80%, and this is a condition for receiving confirmation of regular attendance. Seminar paper/Fieldwork/Laboratory exercises/Practical work (written and oral) ..... 15 points (%) First Partial Exam (written) ..... 35 points (%) Final Exam (Second Partial) (written) ..... 50 points (%) Final Exam (Integral) (written) ..... 85 points (%)
Literature:	Required: 1. Bublin, M., Planiranje saobraćaja i saobraćajnica, Sarajevo 2007. 2. Bublin, M., Prostorno planiranje i zaštita okoline, Univerzitetska knjiga Sarajevo, 2010 3. Bublin, M., Saobraćaj i prostor, Univerzitetska knjiga Sarajevo, 2000 Supplementary: 1. Appleyard, D., Kerin, L., Majer, R., The viev from the road, Harwaed 2. Čekić, Š., Osnovi metodologije i tehnologije znanstvenog i stručnog dijela, Fakultet za saobraćaj i komunikacije, Sarajevo, 1996. 3. Okvirna prometna strategija BiH, Sarajevo, 2016. 4. The study on the transport master plan in Bosnia and Herzegovina, 2001. 5. Zelenika, R., Livio, J., Suvremeni transportni sustavi, Ekonomski fakultet Rijeka, Rijeka, 1995.

Course code:	**Course title:**
09ATCOS010102	INDUSTRIAL TRANSPORT

Level: I	**Year: II**	**Semester: IV**	**Number of ECTS credites: 6**
Status: Mandatory Course		**Total number of hours: 90** Optional breakdown of hours by type: Lectures 45 Tutorials 45	
Course participants:	Academic staff and associates selected in the field to which the course belongs/course		
Prerequisite for enrollment:	No		
Course goal (goals):	Acquistion of educational forms for implementing programs in industrial flow design and management.		
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Introduction – Basics of Industrial Transport 2. Classification and Basic Characteristics of Transport Mechanization 3. Accessories and Auxiliary Devices 4. Basics of Hydraulic Systems 5. Continuous Transport Equipment 6. Discontinuous Transport Equipment 7. Handling Equipment in Industrial Transport 8. Graders, Elevators, Conveyors 9. Cable Cars 10. Curved, Vibrating, and Roller Conveyors 11. Dumpers and Tip Trucks 12. Belt Conveyors and Belt Conveyor Calculations 13. Pneumatic Transport 14. Hydraulic Transport 15. Labor Costs and Optimization of Industrial Transport		
Learning outcomes: (Knowledge; Skills; Competencies)	Through the teaching process, including lectures, exercises, and practical work, students should acquire the necessary knowledge and experience for practical application in the field of design, selection, management, and maintenance of internal transport equipment. This course provides the knowledge needed for optimizing industrial flows.		
Sustainable Development Goal (SDG):	Sustainable Development Goals (SDGs) and Targets that can be linked are: Goal 8: Promote Inclusive and Sustainable Economic Growth, Employment, and Decent Work for All Goal 9: Build Resilient Infrastructure, Promote Inclusive and Sustainable Industrialization, and Foster Innovation		
Teaching methods:	Lectures, tutorials and preparation of seminars with a practical focus.		
Assessment methods with grading structure:	Evaluation and grading of students during the course are carried out as follows: • Attendance at lectures and exercises: 0 – 10 points (%) • Homework/seminar papers/practical work: 0 – 10 points (%) • First partial exam/test/knowledge check: 0 – 15 points (%) • Second partial exam/test/knowledge check: 0 – 20 points (%) The total number of points (%) that a student can achieve based on the above criteria during the course is a maximum of 55 points (%). The final exam is worth up to 45 points or 45 (%). The final exam		

	covers the entire material studied during the course.
Literature:	Required: 1. Ahmić, A., Pretovarna i transportna mehanizacija, Univerzitetska knjiga, Sarajevo, 1996. 2. Marvin I., Prekrcajna mehanizacija, Zagreb, 1997. 3. Dedijer S., Osnovi transportnih uređaja, Građevinska knjiga, Beograd, 1989.

Course code: 10ATCOS010102	**Course title:** LOGISTICS IN TRAFFIC AND COMMUNICATIONS		
Level: I	**Year: I**	**Semester: II**	**Number of ECTS credits: 6**
Status: Mandatory Course		**Total number of contact hours: 90** Lectures: 60 Exercises: 30	
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 goal of the course "Logistics in Transportation and Communications" is to acquire knowledge about logistics as a philosophy of service quality, technological changes in transportation and communications, requirements in logistics development, structure, and needs for the development of modern logistics centers.		
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Concept, definition, and development of logistics as a scientific discipline used in logistics 2. Division and content of logistics according to areas of application 3. Concept, structure, and processes of logistics systems 4. Logistics operators 5. Warehousing 6. Warehousing processes 7. Transport chain in logistics systems, supply, and supply chain 8. Warehousing process in the supply chain 9. Inventory and types of inventory 10. Reverse logistics 11. Information and communication technologies in logistics 12. Logistics strategy 13. Determining the quality of logistics services 14. Quality management in logistics 15. Modern concepts of logistics center development and the logistics center as a strategically significant factor in improving service quality		
Learning outcomes:	Knowledge: The course should ensure a level of competence and knowledge necessary to solve specific problems in the field of logistics, providing theoretical and practical knowledge related to logistics in transportation and communications. Skills: Developed abilities to apply theoretical and practical knowledge in the area of logistics processes in transportation and communications. Competencies: Developed abilities for independent understanding and		

	use of knowledge required to solve specific problems in logistics and logistics processes.
Sustainable Development Goal (SDG):	SDG 8 - Decent Work and Economic Growth SDG 9 - Industry, Innovation, and Infrastructure SDG 12 – Responsible Consumption and Production
Teaching methods:	Teaching is conducted through oral presentations (ex-cathedra) and demonstrations of various systems and processes in the field of logistics in transportation and communications, using video and audio recordings, as well as individual presentations of specific problems in the area of logistics processes based on specific research areas. Initiating discussions and debates with students about practical issues, individual observations from various environments, conducting independent research and analyses in logistics and logistics systems.
Assessment methods with grading structure:	Criteria for monitoring and evaluating student performance during classes are as follows: 1. Homework/Seminar work/Practical work - max 15 points (%), passed if more than 50% is achieved. 2. First Partial Exam/Test/Knowledge Check - max 35 points (%), passed if more than 50% is achieved. 3. Final Exam - written - 20 points 4. Final Exam - oral - 30 points 5. Final Exam (Integral) - written - 40 points 6. Final Exam (Integral) - oral - 45 points To pass, a student must pass the oral part of the exam. The total number of points (%) that a student can achieve according to the monitoring during classes is a maximum of 50 points (%), which combined with the final (second partial) exam makes 100 points (%). For students who did not pass the first partial exam, the final exam (integral) is organized covering all material covered during classes and exercises, valued at 85 points (%), which combined with seminar/practical work makes 100 points (%). Final student performance is evaluated based on the total number of points (%) earned from fulfilling pre-exam obligations and passing the partial and final exams, according to the quality of knowledge and skills acquired, and contains a maximum of 100 points, evaluated as follows: a) 10 (A) - exceptional success with no errors or only minor errors, worth 95-100 points; b) 9 (B) - above average, with some errors, worth 85-94 points; c) 8 (C) - average, with noticeable errors, worth 75-84 points; d) 7 (D) - generally good, but with significant shortcomings, worth 65-74 points; e) 6 (E) - meets minimum conditions, worth 55-64 points; f) 5 (F, FX) - does not meet minimum conditions, less than 55 points. 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 and passing the partial and final exams, according to the quality of knowledge and skills, with a maximum of 100 points, determined according to the following scale: Student Obligations _____points Attendance at lectures and exercises - attendance records are mandatory.

	Attendance in classes and exercises is not graded. Homework/Seminar/Practical work.....max 15 points First Partial Exam/Test/Knowledge Check.....max 35 points Final Exam - written.....max 20 points Final Exam - oral.....max 30 points Final Exam (Integral) - written.....max 40 points Final Exam (Integral) - oral.....max 45 points The final exam is organized so that students who passed the first knowledge check take only the final part of the exam (second part of the material), while students who did not pass the first knowledge check take both the final and the first partial exam (first part of the material). The exam is taken both in writing and orally. This grading scale is adopted according to the Study Regulations at the University of Sarajevo. Note: Students are required to attend all forms of teaching for at least 80% of the total hours. A student may, in justified cases (illness), be absent from classes, for which they must provide a medical excuse. Seminar and homework will be graded only if submitted by the defined deadlines. Late submissions will not be graded.
Literature:	Mandatory: 1. Lecture notes and slides (available for download on the Faculty's website). 2. BERKOVIĆ, M.: Lecture script, "Logistics in Transportation and Communications," Faculty of Transportation and Communications, 2024. 3. KOSOVAC, A.; Muharemović, E.: "Processes of Logistics Systems," Faculty of Transportation and Communications, 2022. 4. ZELENIKA, R.: Logistics Systems, Faculty of Economics in Rijeka, Rijeka 2005. 5. ZELENIKA, R.: Foundations of Logistics Forwarding, Book One, University of Rijeka 2005. Supplementary: 1. ZELENIKA, R.: Transport Systems, Technology-Organization-Economics-Logistics-Management, University of Rijeka 2001. 2. OBLAC, H.: Macro-logistics Policy, Faculty of Economics and Business Maribor, 1996. 3. VASILJEVIĆ, M. R.: "Logistics in Transportation," University of East Sarajevo, Faculty of Traffic Engineering Doboj, Doboj 2015. 4. PERIŠIĆ, R.: Quality Systems of Services, Logistics, and Informatics, Institute of Technical Sciences SANU, Belgrade, 2002.

Course code: 11ATCOS010203	**Course title:** APPLIED MATHEMATICS AND STATISTICS		
Level: I	**Year: II**	**Semester: III**	**Number of ECTS credits: 6**
Status: Mandatory Course		**Total number of contact hours: 90** Optional breakdown of hours by type: Lectures 60 Tutorials 30	
Course participants:	**Academic staff and associates selected in the field to which the**		

	course belongs/course
Prerequisite for enrollment:	No
Course goal (goals):	The goal of the course is for students to acquire knowledge in the field of applied mathematics and general statistics that are significant in traffic and communication scientific/scientific fields (error theory, basics of numerical algebra and analysis, probability and statistics, and the application of combinatorics and probability theory in statistics), as would better follow and master the structure of individual professional subjects that make more extensive use of these important and meaningful areas of modern mathematics.
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Introduction – basics of applied mathematics in engineering (traffic and communications). Errors of approximate values of numbers and functions 2. Numerical solution of linear equations and systems of linear equations, Gaussian algorithm 3. Solving systems of nonlinear transcendental equations. Localization of zeros of polynomials. Determining the minimum of functions 4. Method of least squares. Interpolations and approximations 5. Numerical differentiation and integration 6. Laws of large numbers 7. Elements of combinatorics 8. Introduction to probability theory - Basics of classical probability theory (three classical concepts of probability, basic theorems, formula of total probability and Bayesian formula) 9. General (axiomatic) definition of the concept of probability. Discrete and non-discrete probability spaces 10. Analysis of discrete and continuous random variables. Probability (density) function/law and probability distribution (distribution, theoretical distribution) function 11. Introduction to general and mathematical statistics. Concept, subject and significance of statistics (especially in technical sciences/sciences). 12. Statistical set and statistical units. Characteristics of statistical units. The concept of statistical research. Descriptive statistical analysis, processing and analysis of data and results (graphical presentation of statistical series, measures of variation/dispersion) 13. Method of statistical samples. Statistical (parametric and non-parametric) hypothesis testing 14. Concept and subject of regression analysis: regression and correlation 15. Dynamic analysis in statistics
Learning outcomes:	Knowledge: After completing the course, the student should: • have a developed sense of deductive reasoning; • understand basic concepts from the field of error theory, numerical mathematics, probability theory and statistics and thus be familiar with how intuitive concepts are translated into precise mathematical language; • master standard numerical, stochastic and statistical methods and their applications;

	• understand the role that the linearization process plays in the mathematical modeling of specific physical, traffic, communication and other engineering problems; • master the basic techniques of numerical algebra, numerical analysis, classic and contemporary probability theory and statistics; • deepen the understanding of basic problems in the field of engineering mathematics 1 and 2. Skills: it encourages creativity, precision, systematicity, abstract thinking and critical thinking, which helps in noticing and solving problems, which is essential for continuing education. Competencies: showing and communicating in mathematical language, logical thinking, argumentation and reasoning.
Sustainable Development Goal (SDG):	SDG4 – Quality Education, SDG9 - Industry, innovation and infrastructure
Teaching methods:	Lectures are conducted by the teacher during which theoretical aspects are presented along with solving numerical problems and practical examples. Lectures take place with the use of video and audio recordings. The exercises include solving numerical and practical problems, which also includes solving problems from previous exams with the aim of achieving a better understanding of the presented theoretical topics.
Assessment methods with grading structure:	The criteria for evaluating the student's work and evaluation during classes is as follows: Tests during the semester (or practical task) from 0 - 15 points; 1st partial exam/1st test/1st knowledge test/ from 0 - 35 points (requirement 50%). The total number of points that a student can achieve according to the above-mentioned monitoring during classes is a maximum of 50 points. The final exam is organized from the entire material covered during the course and amounts to a maximum of 50 points, of which there is the II partial exam of 0 - 25 points (requirement 50%) and the final - theory and tasks of 0 - 25 points, which lasts 60 minutes (students pass the theory and tasks they did not do in the partial exams). At the final exam, students can correct the I partial exam, if they did not pass it earlier. The same applies to the exam period for the remedial final exam and both dates of the autumn exam period. 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 85-94.9 points; c) 8 (C) - average, with noticeable errors, carries 75-84.9 points; d) 7 (D) - generally good, but with significant shortcomings, carries 65-74.9 points; e) 6 (E) - meets the minimum requirements, carries 55-64.9 points; f) 5 (F, FX) - does not meet the minimum conditions, 0 – 54.9 points. 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 and passing the partial and final exam, and according to the quality of acquired knowledge and skills, and contains a maximum of 100 points, and is determined according to the following scale: Student obligations _ Points (%)

	Activity / Mini tests / Tasks / Seminar paper .....15 points (%) I Partial exam/Test/Knowledge check/.....35 points (%) Final exam (II Partial + Theory) .....50 points (%)
Literature:	Mandatory: 1. Blažić, M. R., Opšta statistika - Osnovi i analiza, Savremena administracija, Beograd, 1982. 2. Carnahan, B. , H. A. Luther, H. A. , Wilkes, J. O., Applied Numerical Methods, John Wiley &Sons, 1969. 3. Elezović, N., Teorija vjerojatnosti, zbirka zadataka, Element, Zagreb, 1995. 4. Fatkić, H., Vjerovatnoća i statistika, I . dio, The Soros Foundations, FOD BiH, Sarajevo, 1997; Corons, Sarajevo, 2000. 5. Fatkić, H., Hasković, A., Čolaković, A., Avdagić, E., Primjenjena matematika i statistika, Predavanja i vježbe, Slajdovi i bilješke, Sarajevo, 2012, http://www.fsk.unsa.ba/ 6. Hadžć, O., Numeričke i statističke metode u obradi eksperimentalnih podataka,Institut za matematiku, Novi Sad, 1989. Supplementary: 1. Ivanšić, I., Numerička matematika, Element, Zagreb, 1998. 2. Johnson, R. A. , Bhattacharyya, G. K., Statistics: Principles and Methods, Wiley, New York, 5th edition, 2006. 3. Lučić, B., Statistika, Ekonomski fakultet, Sarajevo, 1996.

Course code: 12ATCOS010203	**Course title:** SYSTEMS ENGINEERING		
Level: I	**Year: II**	**Semester: III**	**Number of ECTS credits: 6**
Status: Mandatory Course		**Total number of contact hours: 90** Optional breakdown of hours by type: Lectures: 60 Tutorials: 30	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course**		
Prerequisite for enrollment:	None.		
Course goal (goals):	The aim of the course is to master traffic processes and establish common traffic parameters that enable better integration into a unified traffic network. By achieving adequate interaction between the components of the traffic system throughout its life cycle, an overview of individual phases of technological processes in transportation and communications will be provided.		
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Introduction – terms and definitions 2. Systems approach to studying traffic (Structure of the traffic system; System modeling of traffic) 3. Fundamental system concepts (General definitions and interpretations of the term system; System classification) 4. Analogy, homomorphy, and isomorphy. State and state space. Systems analysis. Systems architecture. Life cycle of the system. 5. System diagrams and tools (Objectogram and funciogram; ER diagrams; DFD diagrams; GPSS block diagrams; Petri net)		

	6. Behavior of open dynamic systems (Types of system behavior; Transient processes; Static and dynamic characteristics of systems) 7. System definition and development (Primary phases of systems engineering; Defining system requirements) 8. Systems and processes of road traffic (System definition of road traffic; System design of the road network) 9. Road traffic technology (System description of passenger and freight transport technology in road traffic) 10. Systems and processes of railway traffic (Defining and describing railway systems; Systems approach to choosing railway vehicles) 11. Systems and processes of air traffic (System definition of air traffic; System development of network infrastructure; Air traffic technology) 12. Systems and processes of telecommunications traffic (System definition of telecommunications traffic; System development of telecommunications networks) 13. Technological processes of Intelligent Networks 14. Systems and processes of postal traffic (System definition of postal traffic; Development of postal networks and technology; Postal traffic technology) 15. Development of intelligent transport systems (ITS concept and services; ITS development)
Learning outcomes:	Knowledge: Through lectures and exercises, as well as through practical work, students will master the course material and gain theoretical and practical knowledge in the field of systems engineering. Skills: The ability to apply theoretical and practical knowledge in the field of system engineering. Competencies: The ability to monitor technological processes with the aim of creating a quality traffic system structure that results in quality, safe, timely, and environmentally friendly traffic services.
Sustainable Development Goal (SDG):	SDG 9 – Industry, Innovation, and Infrastructure SDG 11 – Sustainable Cities and Communities SDG 12 – Responsible Consumption and Production SDG 13 – Climate Action
Teaching methods:	Oral presentation method, discussion method, demonstration method, group work method.
Assessment methods with grading structure:	Evaluation of creativity during lectures and exercises through independent work, assessment of partial tests during the course, as well as evaluation of the final exam. The criteria for monitoring student work and evaluation during the course are as follows: • Homework/seminar paper/practical work: 15 points (%), passed if at least 55% is achieved. • First partial exam/test/knowledge assessment: 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 can take the exam on the material they have not successfully completed during the

	semester. A successful exam result requires at least 55% of the points from the maximum number of points on the partial and final exams, and it is sufficient if the total sum of points (from: homework, attendance, partial and final exams) is 55. Homework is organized through writing assignments and projects. Homework cannot be corrected. For students who have not successfully completed the partial exam, the final exam consists of the entire material covered during the course. The retake exam is organized in the same way as the final exam. The student's final success after all the prescribed forms of knowledge assessment is evaluated and graded according to the following grading system: a) 10 (A) – Excellent without or with minor mistakes, 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 minimum requirements, 55-64 points; f) 5 (F, FX) – Does not meet minimum requirements, less than 55 points. The total evaluation of all student obligations during the semester, or the grade on the exam, is based on the total number of points (%) the student has earned by fulfilling pre-exam obligations and passing the partial and final exams, and is determined according to the following scale: Student Obligations | Points (%) Attendance at lectures and exercises... | - Homework/Seminar/Practice/… | 15 points (%) First partial exam/Test/Knowledge assessment… | 35 points (%) Final exam (Second Partial) | 50 points (%) Final exam (Comprehensive) | 85 points (%)
Literature:	Mandatory: 1. Čaušević S, Bošnjak I, System Engineering in Transport and Communications, University of Sarajevo, Faculty of Transport and Communications, Sarajevo, 2006. 2. Lecture notes and slides.

Course code: 13ATCOS010203	**Course title:** ECONOMICS IN TRAFFIC AND COMMUNICATIONS		
Level: I	**Year: II**	**Semester: III**	**Number of ECTS credits: 6**
Status: Mandatory Course		**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):	Acquisition of basic knowledge in the field of economics in transportation and communications, aimed at creating an economically efficient and high-quality transportation and communication system.		

Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. The concept and significance of economics in transportation and communication models 2. The role of transportation in social reproduction 3. Characteristics of production of transportation and communication services 4. Supply and demand as market elements 5. Shaping and determining the value of transportation and communication services 6. Costs of transportation and communication processes 7. Analysis of cost dynamics 8. Cost residuals and factors of residual costs in transportation and communications 9. Prices of transportation and communication services and the factors they depend on 10. Tariffs and tariff policy 11. Principles of business economics in transportation and communications 12. Investments in transportation and communications 13. Methods for evaluating investment projects in transportation and communication systems 14. Basic features of the tax system and tax policy in transportation and communication systems 15. Factors relevant to managing business economics in transportation and communication systems
Learning outcomes:	Knowledge: Students will acquire knowledge in the field of economics in transportation and communications aimed at creating an economically efficient and high-quality transportation and communication system. Skills: Understanding economic principles and qualitative-quantitative analysis of economic processes that occur in transportation enterprises and the transportation market. Competencies: Application of acquired knowledge in specific models.
Sustainable Development Goal (SDG):	SDG 4: Ensure inclusive and quality education and promote lifelong learning opportunities for all. SDG 8: Promote sustained, 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 10: Reduce inequality within and among countries. SDG 12: Ensure sustainable consumption and production patterns.
Teaching methods:	During the course delivery, the instructor presents individual thematic units (ex cathedra), provides students with access to educational videos (DVDs, video presentations) related to the subject matter, and organizes discussions on assigned topics (interactive teaching). In practical sessions, examples and tasks are analyzed and solved according to theoretical topics, students are assisted in independently solving tasks, and in preparing programs and seminar papers. Case Study, Workshop.
Assessment methods with grading structure:	Criteria for evaluation and grading of student work during the course: Homework: 0 to 5 points Seminar Paper / Project Assignment: 0 to 10 points First Test / Knowledge Check / First Partial Exam: 0 to 35 points

	The total number of points a student can earn during the course is up to 50 points. The final exam covers the material that the student did not pass in the partial exam, meaning it includes the second part of the material (Second Partial Exam), worth 50 points, or it consists of the entire material, i.e., both the First and Second Partial Exams. The overall assessment of all student responsibilities during the semester, and the exam grade, is based on the total number of points (%) the student has earned by completing pre-exam obligations, passing the partial exam, and the final exam. Students can earn up to 100 points based on the following scale: Grading Structure Points (%) Homework: 5 points (%) Seminar Paper / Project Assignment: 10 points (%) First Test / Knowledge Check (First Partial Exam): 35 points (%) Final Exam (Second Partial Exam): 50 points (%) Requirements for Passing the Exam: Total score of 55 points, with at least 55% in each part of the exam (activity, partial exam, final exam). To pass the exam, students must achieve the following minimum scores: Homework: 3 points Activity (Seminar Paper / Project Assignment): 6 points First Test / Knowledge Check / Partial Exam: 19 points Final Exam (Second Partial Exam): 27 points Students who have passed the partial exam will only take the second part of the material (not covered in the partial exam) in the final exam. Students who have not passed the partial exam will take the entire material, with the grading criteria remaining the same. The final exam may be organized as a written and/or oral exam. Activity can be monitored through homework, seminar papers, project assignments, or quizzes. Note: Students are required to attend all forms of teaching at least 80% of the total hours, and attendance is a condition for confirming regular attendance. Students may be absent due to justified reasons (e.g., illness), for which they must provide a medical excuse. Seminar papers and homework will only be graded if submitted by the specified deadlines. Late submissions will not be graded. Final Evaluation and Grading Scale: a) 10 - Outstanding performance with no 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 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: 1. Ferizović, A., Kalem, A., *Economics in Transportation and Communications (Script I part)*, Faculty of Traffic and Communications, Sarajevo, 2020. 2. Ferizović, A., Kalem, A., *Economics in Transportation and Communications (Script II part)*, Faculty of Traffic and Communications, Sarajevo, 2020. 3. Čekić, Š., *Economics in Transport and Communications*, University of Sarajevo, Faculty of Traffic and Communications, Sarajevo, 2005. 4. Novaković, S., *Traffic Economics*, Belgrade. 5. Perić, T., Radačić, Ž., Šimulčik, D., *Economics of the Traffic System*, University of Zagreb, Faculty of Traffic Sciences, Zagreb, 2000. 6. Perović, D., *Cost Theory*, Belgrade. 7. Samuelson, P., Nordhaus, D., *Economics*, Mate, 1992. Supplementary: 1. Petrović-Vujačić, J., *Fundamentals of Economics*, Traffic Faculty, Belgrade, 2010. 2. Šunjić-Beus, M. et al., *Business Economics*, electronic edition, Faculty of Economics, Sarajevo, 2009. 3. Martinović, D., *Break-Even Point as a Business Decision Tool*, Faculty of Economics, Sarajevo, 2013. 4. Thompson, A., *Economics of the Firm: Theory and Practice*, Fifth Edition, New Jersey. 5. Tatić, K., *Managerial Economics*, Faculty of Economics, Sarajevo, 2008. 6. Somun-Kapetnović, R., Arnaut-Berilo, A., Šehić, E., Kahvić, E., *Quantitative Methods in Economics and Management*, Faculty of Economics, Sarajevo, 2009.

Course code: 14ATCOS010203	**Course title:** TRAFFIC INFORMATION SYSTEMS		
Level: I	**Year: II**	**Semester: III**	**Number of ECTS credits: 6**
Status: Mandatory Course		**Total number of contact hours: 90** Lectures: 45; Exercises: 30; Seminar: 15	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course**		
Prerequisite for enrollment:	None		
Course goal (goals):	Acquiring knowledge about information systems, their applications, components, technologies, and development principles, with the aim of equipping students to address tasks and problems related to the planning, development, and analysis of information systems in transportation and communications.		
Topics covered (Units of study):	1. The concept of systems and information systems (IS) 2. Infrastructure and architecture of information systems 3. Information and communication technologies 4. Database management systems		

	5. Software solutions for IS development 6. Communication technologies for IS development 7. The life cycle of information systems development (SDLC) 8. Organization of information systems development 9. Application of CASE tools for IS design 10. Planning of information systems development 11. Process modeling and reengineering: Workflow, DFD, BPR 12. Modeling of structure, database, and behavior of IS 13. Implementation of information systems 14. Analysis of information systems 15. Security and quality of information systems
Learning outcomes:	Knowledge: Students will acquire theoretical and practical knowledge about the types and components of information systems, their design methods, and their application possibilities in transportation and communications. Skills: Students will master the skills and tools used in the design and development of information systems, such as CASE tools. Competencies: Students will be equipped to participate in the planning and development of information systems, particularly those intended for the fields of transportation and communications.
Sustainable Development Goal (SDG):	SDG 9 – Industry, Innovation, and Infrastructure
Teaching methods:	The course is delivered through lectures and practical exercises. Lectures are conducted through oral presentations with slides and practical examples. During the course, discussions are initiated on issues related to the planning, analysis, design, and development of information systems, with a special focus on systems used in transportation and communications. Various methods are used, including: oral presentations, discussions, demonstrations, individual and group work.
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/or seminar papers and/or project tasks, as well as a partial exam. The final/exam includes material not covered in the partial exam, which means it includes the second part of the material (not covered in the partial exam) and is worth 50 points for students who have passed the partial exam, or it covers the entire material worth 80 points for students who did not pass the partial exam. Student activity is monitored and assessed through participation in class discussions, completion of assignments, seminar papers, project tasks, or quizzes. The final/exam can be conducted as a written and/or oral test. 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: • Assignments/Class Participation: 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 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 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: 1. Alem Čolaković, "Traffic Information Systems (LECTURE NOTES)," Faculty of Traffic and Communications, Sarajevo, 2023. Supplementary: 1. Ralph M. Stair, George W. Reynolds, „*Fundamentals of Information Systems*," Cengage Learning, 2016. 2. Alan Dennis, Barbara Haley Wixom, Roberta M. Roth, „*Systems analysis and design*," Wiley, 2015. 3. Patricia Wallace, „*Introduction to Information Systems*," Pearson Education, 2015. 4. Richard T. Watson (editor), „*Information Systems*," Global Text Project (Creative Commons Attribution 3.0 License), 2017. 5. Arthur M. Langer, „*Analysis and Design of Information Systems, Springer-Verlag*," 2008. 6. John Wang, „*Innovations in Supply Chain Management for Information Systems*," Business Science Reference, 2010. 7. Anita Pickerden, „*Planning and Managing your Work Based Projects*," bookboon.com, 2015. 8. Terra Vanzant Stern, „*Lean and Agile Project Management*," Taylor & Francis Group, 2017. 9. Andrew Stellman & Jennifer Greene, „*Learning Agile*," O'Reilly Media, 2015. 10. Christos Kalloniatis: "*Modern Information Systems*," InTech Croatia, 2012. 11. Poliščuk Jaroslav: „*Projektovanje informacionih sistema*," Podgorica, 2007. 12. Kelly R. Jr, Efraim T.: „*Uvod u informacione sisteme*," Data Status, 2009. 13. Information Security Management Systems (ISMS) standards, ISO/IEC 27000 14. ISO 9000 family of quality management systems (QMS) standards

Course code: 15-1ATCES010203	**Course title:** ELEMENTS OF TRANSPORT VEHICLES AND DEVICES		
Level: I	**Year: II**	**Semester: III**	**Number of ECTS credits: 6**
Status: Elective course		**Total number of contact hours: 90** Lectures 60	

	Exercises 30
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course**
Prerequisite for enrollment:	None
Course goal (goals):	The aim of the course is to acquaint the student with rational structural forms, work principles, calculation bases and principles of material selection, elements and devices of transport and handling devices.
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Introduction. Connecting elements. Welded, soldered, glued joints. Joints with rivets. 2. Bolted joints. Joints with studs. streaming. Stokes theorem 3. Elastic joints. 4. Elements for circular movement. Shaft and axles. 5. Couplings. Bearings. 6. Power transmission elements. Friction gears. 7. Gear transmissions. 8. Transmission belts. 9. Characteristics of power transmissions and their application on transport and handling vehicles. 10. Elements for conducting fluids (liquids) and gases (pipes, pipe closures and others). 11. Introduction. The first main law of thermodynamics 12. Calorific properties of gases. Mixtures of gases 13. Changes in the state of gases. Circular processes. 14. The second main law of thermodynamics 15. Heat engines. Compressors. Motors SUS. Turbines
Learning outcomes:	Knowledge: Knowledge of basic structural forms, principles of operation, basis of calculations and selection of materials for elements and devices of transport and handling equipment. Skills: The application of acquired knowledge from the above-mentioned field will enable the student to make the most of the exploitation characteristics of elements and devices that are built into transport and handling vehicles during practical work and make the correct selection of elements. Acquired knowledge from this subject is necessary for easier monitoring and understanding of other professional subjects in the continuation of studies. Competencies: Through the teaching process of lectures, exercises and doing homework, the student will be able, based on the acquired knowledge, to: – understand the basic principles of operation of compressors, sus engines and gas turbines. – analyzes the elements and devices that are included in the composition of transport and transshipment means and to make the correct selection and replacement of the necessary elements. – set up and define mechanical-mathematical models of power transmission from the drive to the working part of transport and transshipment systems and make a proper selection of the necessary equipment and the power of the power unit.

Sustainable Development Goal (SDG):	SDG12 – Responsible consumption and production
Teaching methods:	– Independent presentation – Discussion – Analysis of examples from practice (assignments, seminar papers)
Assessment methods with grading structure:	Assessment of creativity in classes and exercises with the creation of independent works, assessment of the partial test during the class as well as the assessment of the final exam. Criterion monitoring the work and evaluating the student during classes, according to the following method: – Homework/seminar work/practical work/ 15 points (%), passed if over 55% is won. – I Partial exam/test/knowledge check/35 points (%), passed if more than 55% is won. – Final exam (II Partial) 50 points (%), passed if over 55% is won. – Final exam (Integral) 85 points (%), passed if more than 55% is won. The total number of points (%) that a student can achieve according to the mentioned monitoring during classes is a maximum of 50 points (%), which with the Final (II partial) 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 testing, is evaluated and graded by the grading system as follows: 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 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. 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 pre-exam obligations and passing the partial and final exam, and according to the quality of acquired knowledge and skills, and contains a maximum of 100 points, and is determined according to the following scale: Student obligations _____Points (%) Attendance at lectures and exercises.....80 (%) Assignment/Seminar/Practice/.....15 points (%) I Partial exam/Test/Knowledge check/.....35 points (%) Final exam (II Partial) .....50 points (%) Final exam (Integral) .....85 points (%)
Literature:	Mandatory: 1. Perše, S., Višnjić, V.: Traffic Engineering, Faculty of Traffic Sciences, Zagreb, 2000.

	2. Decker, KH: Elements of machines, Technical book, Zagreb, 1975. 3. Vrhovski, D., Nikšić. M.: Fundamentals of mechanical engineering - a collection of solved problems, FPZ, Zagreb, 1998. Supplementary: 1. Šelmić, R.: Elements of transport means and devices, Faculty of Transport, Belgrade, 2005. 2. Šelmić, R, Mijailović, D., Perišić, D.: Elements of transport means and devices - Praktikum Saobračajni fakultet, Belgrade, 2006. 3. Šelmić, R.: Technical thermodynamics, Faculty of Transportation, Belgrade, 2006.

Course code: 15-2ATCES010203	**Course title:** INFORMATION AND COMMUNICATION THEORY		
Level: I	**Year: II**	**Semester: III**	**Number of ECTS credits: 6**
Status: Elective course		**Total number of contact hours: 90** Optional breakdown of hours by type: Lectures: 45 Tutorials: 30 Laboratory Tutorials: 15	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course**		
Prerequisite for enrollment:	None		
Course goal (goals):	Students acquire basic theoretical knowledge necessary for studying modern digital telecommunications systems: basic theoretical and partially practical knowledge in the field of information theory and communications, in a scope corresponding to an introductory course in these areas, and the basics of information and IP networks.		
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Information: Random events. Definition of information, mathematical interpretation, properties of information at the syntactic, semantic, and programmatic levels. Content of information. Logic, syntax, and semantics. Formal systems, methods, and techniques. Information sources and types. 2. Discrete Information Sources: Amount of information, entropy. Properties of entropy. Entropy of continuous sources. Conditional entropies, mutual information. Sources with memory - Markov sources, ergodic sources. Entropy of Markov sources, higher-order sources. 3. Source Coding: Basic concepts, prefix codes, Kraft inequality. Statistical coding. Optimal statistical coding, extended source coding. The first Shannon theorem. Shannon-Fano code, Huffman code. 4. Statistical Channel Model: Discrete channel, basics of error-correcting coding. Shannon's coding theorem. 5. Signals: Concept, classification. Deterministic signals: signal processing in the frequency domain. Fourier series. Fourier transform. 6. Random Processes: Autocorrelation function. Power spectral density. Noise signals. Gaussian noise.		

	7. Continuous Channel: Concept, continuous channel with additive Gaussian noise, channel capacity. 8. Analog-to-Digital Conversion: Discrete representation of a continuous signal. Amplitude quantization. PCM. 9. Specificities of Digital Signal Transmission: Telecommunication system model, baseband transmission. 10. Specificities of Digital Signal Transmission in Transposed Band: Linear digital modulation: ASK, FSK, PSK, QAM. Multiple access. 11. Networks: Information network. Telecommunications network. Network characteristics. OSI and IP network models. 12. Internet Networks: IP protocol. TCP/IP protocol family. IP addressing. 13. Internet Communications: Principles, advanced Internet applications, and communication techniques, web organization. 14. Telecommunication Networks: Division, specifics of wired and wireless networks. Quality of service in networks (QoS). 15. Advanced Telecommunication Techniques and Multiple Access: Spread spectrum, multicarrier systems.
Learning outcomes:	Knowledge: Basic theoretical and partially practical knowledge in the field of information theory and communications in a scope corresponding to an introductory course in these areas and the basics of information and IP networks. Skills: Ability to apply theoretical and practical knowledge in the field of modern digital telecommunications systems. Competencies: Ability to independently analyze basic parameters relevant to information theory, design and analyze system characteristics of discrete and continuous channels, ability to use basic analytical methods in the analysis of information and IP networks.
Sustainable Development Goal (SDG):	– SDG4 – Quality Education – SDG5 – Gender Equality – SDG9 – Industry, Innovation, and Infrastructure – SDG17 – Partnerships for the Goals
Teaching methods:	The teaching is conducted through lectures, exercises, and laboratory exercises. The following methods are used: oral presentation method, discussion method, demonstration method, graphical works method, drawing method, and group work method. During lectures, theoretical concepts and principles are covered with descriptive examples and the solving of certain tasks. Additional examples are considered and solved through exercises and laboratory exercises, enabling continuous work and preparation for independent problem solving. Homework/seminar/practical work aims to develop skills for individual and team work, as well as the organization and realization of practical projects.
Assessment methods with grading structure:	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 doing 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: 1. Lecture notes and slides 2. K. Suruliz i M. Hadžialić, Statistička teorija telekomunika- cija, Elektrotehnički fakultet u Sarajevu, 2009, ISBN 978-9958-629-27-3. 3. B. P. Lathi, Modern Digital and Analog Communication Systems, Oxford University Press, New York 998. Supplementary: 1. V. Sinković, Informacijske mreže, Školska knjiga, Zagreb, 1994. 2. Bažant i dr, Osnovne arhitekture mreža, Element, 2004. 3. M. Schwartz, Telecommunications Network: Protocols, Modelling and Analysis, Adisson-3. Wesley PC, Reading, Massachusetts, 1987. 4. J. F. Kurose, K.W. Ross, Internet and Communication Networks, Mc Graw-Hill, 2003.

Course code: 16TRTOS010204	**Course title:** ROAD VEHICLES		
Level: I	**Year: II**	**Semester: IV**	**Number of ECTS credites: 6**

Status: Mandatory Course	**Total number of contact hours: 90**
Course participants:	Academic staff and associates selected in the field to which the course belongs/course
Prerequisite for enrollment:	None
Course goal (goals):	Mastering knowledge of basic concepts related to road vehicles, with a special focus on the principles of operation, function, and structural solutions of the main systems used in modern road vehicles.
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Modern road vehicles. Classification of road vehicles. Basic systems of road vehicles. Definition of internal combustion engines (ICE). Brief history of internal combustion engines. 2. Types of engines. Main engine components. Auxiliary systems. 3. Engine cycles. Comparison of cycles. Performance characteristics of internal combustion engines (energy, environmental, operational). 4. Types of characteristics. Speed characteristics. Load characteristics. Universal characteristics. 5. Fuel supply system in Otto engines. Combustion in Otto engines. 6. Fuel supply system in diesel engines. Mixture formation and combustion in diesel engines. 7. Basic engine systems. Power transmission systems. 8. Transmission. 9. Elastic suspension system. 10. Steering system. Basic elements of the system. System classifications. 11. Braking system. Role and functions of the system. Basic characteristics of the braking system. 12. Other vehicle devices. 13. Regulations for vehicles in international road transport. 14. Ecology, noise, technical and safety effects, etc. 15. Current ECE regulations and future plans.
Learning outcomes: (Knowledge; Skills; Competencies)	Knowledge: Through the teaching process of lectures, exercises, and seminar work, the student will be able, based on acquired knowledge, to: • Properly approach the selection of an optimal vehicle for specific operating conditions, both from the aspect of the engine and other systems installed in the vehicle. Skills: • Use technical literature, manuals, and tables from this field. • Follow and adopt knowledge from professional subjects related to road traffic safety. Competencies: By mastering the knowledge of basic principles of operation and functions of vehicle systems, the student acquires competencies related to procedures for technical maintenance, certification, and homologation of vehicles.
Sustainable Development Goal (SDG):	SDG7 – Affordable and Clean Energy SDG9 – Industry, Innovation and Infrastructure SDG11 – Sustainable Cities and Communities SDG12 – Responsible Consumption and Production

	SDG13 – Climate Action SDG16 – Peace, Justice and Strong Institutions SDG17 – Partnerships for the Goals
Teaching methods:	Lectures and discussions: A traditional method in which theoretical knowledge is conveyed to students. Multimedia tools: Use of video materials, presentations, simulations, and interactive tools for better understanding of the material. Workshops and exercises: Active learning through practical examples, problem-solving, and applying theory to real-world situations. Projects and research: Working on projects related to road vehicles, such as designing safety systems. Field visits: Visits to service centers, auto mechanic workshops, vehicle inspection stations, certification laboratories, homologation workshops, and traffic police. Online: Using online platforms, tools, and resources for learning, with an emphasis on information exchange. Case studies: Analysis of real-world situations or problems related to road vehicles.
Assessment methods with grading structure:	
Literature:	Required: 1. Mustafić, F. Klisura: CESTOVNA VOZILA, 3.izmjenjeno i dopunjeno izdanje, Institut za privredni inženjering, Zenica, 2021. 2. P. Knor: Projektiranje i konstrukcija motornih vozila – skripta, Mašinski fakultet Sarajevo, Sarajevo 2005. 3. Mahalec, Z. Lulić, D. Kozarac: Motori sa unutarnjim izgaranjem, FSB Zagreb, Zagreb 2010. 4. D.krpan; D.Jeras: Laki motori I, Sveučilište u Zagrebu, 1976. 5. Č. Duboka: Tehnologije održavanja motornih vozila, Mašinski fakultet Beograd, Beograd 1992. 6. Filipović, Dž.Bibić, B .Pikula: Sistemi za dobavu goriva kod dizel motora , Mašinski fakultet Beograd, 2010 Supplementary: 1. Filipović: Motorna vozila, predavanja, Fakultet za saobraćaj i komunikacije, Sarajevo, 2002. 2. F. Klisura: Cestovna vozila, predavanja, Fakultet za saobraćaj i komunikacije, Sarajevo, 2022 i 2023. 3. F. Klisura: Cestovna vozila, vježbe zadaci, Fakultet za saobraćaj i komunikacije, Sarajevo, 2022 i 2023.

Course code: 17TRTOS010204	**Course title:** TELETRAFFIC THEORY		
Level: I	**Year: I**	**Semester: IV**	**Number of ECTS credits: 6**
Status: Mandatory Course		**Total number of contact hours: 90** Lectures: 60 Exercises: 30	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course**		

Prerequisite for enrollment:	Attendance and active participation in lectures and exercises are mandatory, as well as the preparation of a seminar paper and independent exercise tasks.
Course goal (goals):	The curriculum covered by the content aims to provide students with an introduction to the basics of Traffic Flow Theory and the fundamental methods of traffic engineering calculations. The objective is to equip students with the theoretical and professional foundation for the design of traffic infrastructure, which represents an essential element in traffic planning
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. The subject and tasks of traffic flow theory, Technical basis of road traffic 2. Basics of routing and design of roadways 3. Movement of individual vehicles, Defining traffic flow parameters 4. Characteristics of traffic flows, Theoretical relationships between basic traffic flow parameters, Characteristic values of basic traffic flow parameters 5. Empirical models of interdependence between basic traffic flow parameters 6. Mathematical models describing vehicle movement laws in road traffic flows 7. Monitoring and control of road traffic flows 8. Pedestrian flows 9. Capacity analysis and dimensioning of parts of the traffic network under prevailing traffic conditions 10. Freight and passenger flows on railways 11. Tracks and track installations, locomotives, railway cars, operation of the railway network, and determination of the capacity and transport capability of railway lines 12. Turnover of wagons and speeds in railway traffic, operation of locomotives, locomotive turnover, required number of locomotives, train traffic diagrams 13. Capacity planning in air traffic, aircraft operation, air traffic routes, execution of the transport process, air route exploitation 14. Traffic flows at airports 15. Models for assessing air transport demand, travel distribution models, multimodal models, flight frequency, time losses, alignment of transport capacities with passenger requirements, traffic distribution on the network.
Learning outcomes:	Through lectures, exercises, and practical work, students are expected to acquire the necessary knowledge and experience for practical application in the field of traffic infrastructure planning and its alignment with demand, as well as with current and future needs in various modes of transportation. The course on Traffic Flow Theory aims to provide the required level of knowledge about the rules, methods, and procedures for monitoring and determining the laws governing vehicle movement in traffic flows. Additionally, the course equips students with the knowledge and skills necessary for monitoring and managing traffic flows, with the goal of educating them on aligning existing and planned infrastructure with the demands of modern transportation.
Sustainable Development	SDG 9: Industry, Innovation, and Infrastructure

Goal (SDG):	SDG 11: Sustainable Cities and Communities SDG 13: Climate Protection
Teaching methods:	The course is delivered through lectures, exercises, and practical work, which includes the creation of project assignments. Lectures are conducted through oral presentations, accompanied by slides and examples from practice. Discussions on issues related to the planning and design of traffic infrastructure are encouraged. Students will be required to create and present seminar papers and/or project tasks. Various teaching methods are used, including oral presentations and discussions, demonstrations of examples, graphical and video illustrations, and promoting group work using appropriate methodological approache
Assessment methods with grading structure:	Evaluation criteria and grading during the course are as follows: Attendance at lectures and exercises will be recorded; attendance is mandatory as a condition for taking the exam, with a maximum of 20% unexcused absences allowed. Regular attendance will not be awarded additional points. Homework/seminar paper/practical work is graded from 0 to 15 points, and only students who fulfill over 50% of these requirements will be evaluated. During the course, only one knowledge check will be organized – a partial exam in the 7th or 8th week of classes, worth 35 points, and only students who pass over 50% of this partial exam will be graded. The final exam is worth up to 50 points.
Literature:	Mandatory: 1. Kuzović Lj.: Traffic Flow Theory, Građevinska knjiga, Belgrade, 1987. 2. Kuzović Lj., Bogdanović V.: Traffic Flow Theory, FTN Publishing Novi Sad, 2010. 3. Kovačević P.: Railway Operations, Publishing and Propaganda Institute of JŽ, Belgrade, 1986. 4. Kiso Fahrudin., Kiso Fadila: Airports, Faculty of Transport and Communications Sarajevo, 2000. 5. Teodorović D.: Models in Air Transport, Traffic Faculty Belgrade, 1988. 6. Kiso F.: Flows in Railway Traffic, Lecture Notes, 2009. 7. Kiso F.: Flows in Air Traffic, Lecture Notes, 2012. 8. Mussone L.: Instruments for Monitoring Road Traffic Flows, Education and Culture TEMPUS, Sarajevo, 2004. 9. Highway Capacity Manual 2010, Transportation Research Board, National Research Council, Washington D.C., 2010.

Course code: 18TRTOS010204	**Course title:** MATERIALS AND GOODS IN TRANSPORT		
Level: I	**Year: II**	**Semester: IV**	**Number of ECTS credites: 6**
Status: Mandatory Course		**Total number of contact hours: 90** Lectures 60 Tutorials 30	
Course participants:	Academic staff and associates selected in the field to which the course belongs/course		

Prerequisite for enrollment:	None
Course goal (goals):	The primary objective of the course "Materials and Goods in Transport" is to acquire knowledge about the technical-technological, economic-commercial, and transport aspects of the study of materials science; classification, standardization, and identification of products. The course aims to provide knowledge of a new conceptual approach to the quality of materials, goods, and services through familiarization with and elaboration of key concepts. It also aims to introduce the fundamental characteristics of materials used in transport technology and materials that appear as goods in transport, with the goal of preserving their utility value in all phases of the transport process.
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Introduction. Basic concepts of materials and goods. Transport aspect. 2. Division and classification of materials, goods, and services. 3. General concepts of standardization and related activities (accreditation, certification, testing, metrology, calibration). 4. Product quality and quality control. Foundations and principles of European transport policy in relation to quality. 5. Technical-technological elements of the quality of materials, goods, and services. 6. Economic-commercial elements of the quality of materials, goods, and services. 7. Methods for determining the quality of materials and goods. 8. Labeling and identification of materials and goods. Documents for goods in transport. 9. Bulk handling, packaging, and packing of materials and goods. 10. Materials for transport technology: classification, properties, control. 11. Methodology for selecting materials for transport technology. 12. Materials as goods in transport - transporting materials. 13. Classification and properties of transported goods: hazardous materials, bulk cargo, live animals. 14. Official controls of transported goods. 15. Concluding considerations.
Learning outcomes: (Knowledge; Skills; Competencies)	Knowledge: The subject of study should ensure a level of competence and knowledge necessary for solving specific problems in the field of transport of goods and materials. Theoretical and practical knowledge in the area of materials and goods in transport is essential. Additionally, the proposed program should highlight a scientific approach to the problems of transporting various materials and goods. Skills: Developed abilities to apply theoretical and practical knowledge regarding the behavior of goods and materials in transport. Competencies: Developed abilities for independent understanding and application of knowledge necessary to address specific problems related to the behavior of goods and materials in transport.
Sustainable Development Goal (SDG):	SDG8 – Decent Work and Economic Growth SDG9 – Industry, Innovation and Infrastructure SDG12 – Responsible Consumption and Production

Teaching methods:	The teaching is conducted through oral presentations (ex cathedra) and demonstrations of various processes related to the behavior of goods and materials in transport, utilizing video and audio recordings, as well as independent presentations of specific problems in the area of product identification. The course encourages discussions and debates with students about practical issues, individual observations from different environments, and the development of independent research and analyses on the behavior of goods and materials in transport.
Assessment methods with grading structure:	Criteria for Monitoring and Evaluating Student Performance During the Course: 1. Homework/Seminar Paper/Practical Work: max 15 points (%), passing if over 50% is achieved. 2. First Partial Exam/Test/Knowledge Check: max 35 points (%), passing if over 50% is achieved. 3. Final Exam - Written: 20 points. 4. Final Exam - Oral: 30 points. 5. Final Exam (Integrated) - Written: 40 points. 6. Final Exam (Integrated) - Oral: 45 points. To pass the exam, the student must pass the oral part of the exam. The total number of points (%) that a student can achieve according to the outlined criteria during the course is a maximum of 50 points (%), which, combined with the Final Exam (II partial), totals 100 points (%). For students who did not pass the First Partial Exam, the Final Exam (Integrated) will be organized based on the entire material covered during the course and exercises, and will be graded out of 85 points (%), which combined with the seminar paper/practical work totals 100 points (%). The final success of the student after all planned knowledge assessments is evaluated and graded using the following grading system: a) 10 (A) - Exceptional success with no errors or minor errors, worth 95-100 points; b) 9 (B) - Above average, with some errors, worth 85-94 points; c) 8 (C) - Average, with noticeable errors, worth 75-84 points; d) 7 (D) - Generally good, but with significant deficiencies, worth 65-74 points; e) 6 (E) - Meets minimum requirements, worth 55-64 points; f) 5 (F, FX) - Does not meet minimum requirements, less than 55 points. The overall evaluation of all student obligations during the semester, and the grade on the exam, is based on the total number of points (%) that the student earned by fulfilling pre-exam obligations and passing the partial and final exams, according to the quality of acquired knowledge and skills, totaling a maximum of 100 points, and is determined according to the following scale: Student Obligations _____ points Attendance at lectures and exercises - attendance records must be kept. Attendance at classes and exercises is not graded. Homework/Seminar/Practical/..... max 15 points First Partial Exam/Test/Knowledge Check/..... max 35 points Final Exam - Written ..... max 20 points Final Exam - Oral ..... max 30 points

	Final Exam (Integrated) - Written..... max 40 points Final Exam (Integrated) - Oral..... max 45 points The final exam is organized so that students who have passed the first knowledge check only take the final part of the exam (II part of the material), while students who have not passed the first knowledge check will take both the first partial exam (I part of the material) and the final exam together. The exam is conducted in written and oral formats. The specified scale is adopted according to the Rules of Study at the University of Sarajevo. Note: Students are required to attend all forms of classes for a minimum of 80% of the total hours. A student may, in justified cases (illness), be absent from classes, for which they are required to submit a medical excuse. The seminar paper and homework will only be graded if submitted by the defined deadlines. Late submissions will not be graded.
Literature:	Required: 1. Bilješke i slajdovi s predavanja (moći će se preuzeti na WEB site-u Fakulteta). 2. BERKOVIĆ, M.: skripta predavanja, „Materijali i robe u transportu, Univerzitet u Sarajevu - Fakultet za saobraćaj i komunikacije, 2024. godine. 3. BEHMEN, A., SALIHOVIĆ, S., Materijali i robe u transportu, Knjiga I - klasifikacija, standardizacija, identifikacija, Fakultet za saobraćaj i komunikacije Sarajevo, 2007. 4. BEHMEN, A., SALIHOVIĆ, S., Materijali i robe u transportu, Knjiga II – kvalitet: osnove, principi, kontrola, Fakultet za saobraćaj i komunikacije Sarajevo, 2008. 5. ŠPAGNUT, D., Tehnološke osobine roba u transportu, Saobraćajni fakultet, Beograd, 1989. 6. DŽANIĆ, H., Tehnologija materijala u prometu, Fakultet prometne znanosti, Zagreb, 1989. 7. DŽANIĆ, H., Tehnologija materijala za prometnu tehniku, Fakultet prometne znanosti, Zagreb, 1995. 8. ŠTRUMBERGER, N., Tehnologija materijala, Fakultet prometne znanosti, Zagreb, 1996. 9. Međunarodni/evropski Pravilnici o prijevozu opasnih materija:RID, ADR, IATA, IMDG, AND 10. BAS/EN/ISO/IEC standardi Supplementary: Grupa autora: TRANSPORT OPASNIH MATERIJA, Univerzitet u Sarajevu Fakultet za saobraćaj i komunikacije, 2023.

Course code: 19-20-1TRTES010204	**Course title:** LOGISTICS SYSTEMS		
Level: I	**Year: II**	**Semester: IV**	**Number of ECTS credites: 6**
Status: Elective Course		**Total number of contact hours: 90** Lectures 45 Tutorials 30 Seminars: 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 primary goal of the elective course "Logistics Systems" is to acquire and master fundamental theoretical knowledge about logistics systems in transportation and traffic, as well as to apply this knowledge through practical exercises and the development of independent seminar papers. The course aims to provide an understanding of the role and function of logistics systems in the modern economy, along with a detailed exploration of technical concepts. Students will become familiar with the basic characteristics of logistics systems during the phases of planning, implementation, and control of efficient flows and storage of goods, services, and related information from the point of origin to the point of consumption in order to meet customer demands.
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Introduction to "Logistics Systems": Concept, Structure, and Mission of the Logistics System; Trends 2. Basic Concepts of Logistics and Distribution: Structure of General and Universal Logistics Systems 3. Commodity and Information Flows in the Logistics Chain: Distribution Channels, Operations, and Supply Chain Management 4. Basic Characteristics and Functions of Logistics Systems: Modalities of Managing Commodity Flows in Logistics Systems 5. Logistics Networks: Functional (Sub) Systems of the Logistics System 6. Warehouses in the Logistics Network: Warehouse Logistics Systems; Concept and Mission of Warehouse Logistics 7. Concept, Function, and Mission of Information Logistics Systems 8. Concept of Transportation Logistics Systems: Structure, Mission, and Management of Transportation Logistics Systems 9. Handling Logistics Systems: Inventory Management; Control of the Logistics System 10. Warehouse Information Systems and Management of Warehouse Logistics Systems 11. Concept and Importance of Distribution Logistics Systems: Designing Distribution Systems 12. Analysis of the Logistics System: Physical Internet; Structure, Mission, and Management of Logistics Distribution Systems 13. Concept, Characteristics, Structure, and Mission of Educational Logistics Systems 14. Logistics Business Service Systems: Systems for Legal, Accounting, Market, and Other Business Activities in Logistics 15. Concluding Considerations
Learning outcomes: (Knowledge; Skills; Competencies)	Knowledge: Through the instructional process of lectures, exercises, seminars, and practical work, students should acquire the relevant knowledge and experience in the field of logistics

	systems. The course of study should ensure a critical level of competencies and knowledge necessary to address specific problems within logistics systems. Additionally, the curriculum should highlight a scientific approach to the issues related to logistics systems. Skills: Developed abilities to apply theoretical and practical knowledge in the field of logistics systems. Competencies: Developed capabilities for independent understanding and utilization of knowledge needed to solve specific problems in the field of logistics systems.
Sustainable Development Goal (SDG):	SDG 8: Decent Work and Economic Growth SDG 9: Industry, Innovation, and Infrastructure SDG 12: Responsible Consumption and Production
Teaching methods:	The course is conducted through lectures and practical exercises. Lectures are delivered through oral presentations accompanied by visual aids, showcasing relevant examples. Discussions on issues related to the management and organization of logistics systems are initiated. Students will be required to prepare and present seminar papers. Various teaching methods are employed, including oral presentations and discussions, demonstrations of examples, video presentations, and encouraging independent work through appropriate methodological approaches.
Assessment methods with grading structure:	The following criteria will be used to monitor and evaluate student performance throughout the course: 1. Homework/Seminar Paper/Practical Work: max 15 points (%), passed if over 50% is achieved. 2. First Partial Exam/Test/Knowledge Check: max 35 points (%), passed if over 50% is achieved. 3. Final Exam - Written: max 20 points. 4. Final Exam - Oral: max 30 points. 5. Final Exam (Comprehensive) - Written: max 40 points. 6. Final Exam (Comprehensive) - Oral: max 45 points. To pass the course, students must pass the oral component of the exam. The total number of points (%) that students can earn during the course amounts to a maximum of 50 points (%), which combined with the Final Exam (II Partial) makes a total of 100 points (%). For students who did not pass the first Partial Exam, the Final Exam (Comprehensive) will cover all material taught during the course and will be graded out of 85 points (%), which together with the seminar paper/practical work totals 100 points (%). The final success of the student, after all prescribed forms of knowledge assessment, will be evaluated and graded using the following system: a) 10 (A) - Outstanding achievement with no errors or only minor errors, worth 95-100 points; b) 9 (B) - Above average, with some errors, worth 85-94 points; c) 8 (C) - Average, with noticeable errors, worth 75-84 points; d) 7 (D) - Generally good, but with significant shortcomings, worth

	65-74 points; e) 6 (E) - Meets minimal requirements, worth 55-64 points; f) 5 (F, FX) - Does not meet minimal requirements, less than 55 points. The overall assessment of all student obligations during the semester, or the exam grade, is based on the total number of points (%) that the student earned by fulfilling pre-exam obligations and passing the partial and final exams, according to the quality of knowledge and skills acquired. This totals a maximum of 100 points, determined according to the following scale: Student Obligations _____Points Attendance at lectures and exercises - attendance records will be maintained. Attendance is not scored. Homework/Seminar Paper/Practical Work ..... max 15 points First Partial Exam/Test/Knowledge Check ..... max 35 points Final Exam - Written ..... max 20 points Final Exam - Oral ..... max 30 points Final Exam (Comprehensive) - Written ..... max 40 points Final Exam (Comprehensive) - Oral ..... max 45 points The final exam will be organized so that students who have passed the first knowledge check will only take the final part of the exam (II part of the material), while students who did not pass the first knowledge check will take both the final and the first partial exam (I part of the material). The exam will be both written and oral. This grading scale is adopted in accordance with the Study Regulations at the University of Sarajevo. **Note:** Students are required to attend all forms of classes for a minimum of 80% of the total hours. A student may be absent from class for justified reasons (e.g., illness), for which they must provide a medical excuse. Seminar papers and homework will only be graded if submitted by the defined deadlines. Late submissions will not be graded.
Literature:	Required: 1. Bilješke i slajdovi s predavanja (moći će se preuzeti na WEB site-u Fakulteta). 2. Berković, M.: skripta predavanja, „Logistički sistemi, Fakultet za saobraćaj i komunikacije, 2024. godine, 3. Berković, M.: skripta predavanja, „Logistika u saobraćaju i komunikacijama, Fakultet za saobraćaj i komunikacije, 2024. godine. Supplementary: 1. Perišić, R., Sistem kvaliteta usluga, logistika i informatika, Institut tehničkih nauka SANU, Beograd, 2002. 2. Zelenika, R., Prometni sustavi, Tehnologija-organizacija-ekonomika-logistika-menadžment, Sveučilište u Rijeci 2001.

Course code:	**Course title:**
19-20-2TRTES010204	FREIGHT FORWARDING BUSINESSES

Level: I	**Year: II**	**Semester: IV**	**Number of ECTS credits: 6**
Status: Elective Course		**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):	Acquisition of the necessary knowledge in the field of forwarding to adopt basic procedures, techniques, and processes for organizing international trade and goods transport flows.		
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Basic characteristics of freight forwarding and freight forwarders 2. Functions of freight forwarding in international trade 3. Types of freight forwarding 4. International freight forwarding as a system 5. Professional organizations for international freight forwarding 6. FIATA documents 7. Basic tasks of an international freight forwarder 8. Routing 9. Legal position of freight forwarders in customs procedures 10. Transport insurance 11. Special tasks of an international freight forwarder 12. Legal position of freight forwarders in the world and Bosnia and Herzegovina 13. Obligations, rights, and responsibilities of freight forwarders from the forwarding contract 14. Incoterms 15. The role of freight forwarders in the application of Incoterms		
Learning outcomes:	Knowledge: Through lectures, exercises, and practical work, students acquire relevant knowledge and experience for practical application in the field of international trade and freight forwarding operations. Skills: By applying the acquired knowledge, students will be equipped to shape, organize, and execute international goods flows and perform all tasks related to logistics and forwarding. Competencies: Application of the acquired knowledge in specific models.		
Sustainable Development Goal (SDG):	SDG 4: Quality Education SDG 8: Decent Work and Economic Growth SDG 9: Industry, Innovation, and Infrastructure SDG 12: Responsible Consumption and Production		
Teaching methods:	During the program, the instructor presents individual thematic units (lecturing ex cathedra), allows students to view educational video content (DVDs, video presentations) related to the subject area, and organizes discussions on assigned topics (interactive teaching). In the exercises, examples and tasks related to the theoretical topics are reviewed and solved, students are assisted in independently solving tasks, and they are guided in the preparation of programs and seminar		

	papers. Case studies and workshops are also conducted.
Assessment methods with grading structure:	Criteria for assessing and grading students' work during the course are as follows: Homework: 0 to 5 points, passed if over 50% is achieved Seminar Paper / Project Task: 0 to 10 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 (%) Homework: 5 points (%) Seminar Paper / Project Task: 10 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 (Homework): 2.5 points Activity (Seminar Paper / Project Task): 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. Zelenika, R., *International Freight Forwarding*, Faculty of Economics, Rijeka, 1996. 2. Zelenika, R., *Fundamentals of Logistics Forwarding*, Faculty of Economics, Rijeka, 2005. 3. F. Jašarević, V. Peulić, *Logistics and Forwarding*, Banja Luka, 2005. Supplementary: 1. Ivaković, Č., Stanković, R., Šafran, M., *Freight Forwarding and Logistic Processes*, Faculty of Transport and Traffic Sciences, Zagreb, 2010. 2. Kilibarda, M.J., *Freight Forwarding and Agency Business*, Faculty of Transport and Traffic Engineering, Belgrade, 2009. 3. Mađarić, J., *International Freight Forwarding*, Faculty of Transport and Traffic Sciences, Zagreb, 1991. 4. M. Kilibarda, M. Andrejić, V. Pajić, *Freight Forwarding and International Logistics*, Belgrade, 2022. 5. M. Kilibarda, M. Andrejić, V. Pajić, *Practicum in Freight Forwarding*

Course code: 19-20-3TRTES010204	**Course title:** VERTICAL TRANSPORT		
Level: I	**Year: II**	**Semester: IV**	**Number of ECTS credites: 6**
Status: Elective Course		**Total number of contact hours: 90** Optional breakdown of hours by type: Lectures 45 Tutorials 30 Seminar 15	
Course participants:	Academic staff and associates selected in the field to which the course belongs/course		
Prerequisite for enrollment:	No		

Course goal (goals):	Acquistion of educational forms for implementing programs in the field of selection, management, and modernization of vertical transport.
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Types of Vertical Transport Devices 2. Classification of Elevators 3. Wire Rope Traction Elevators 4. Slow-Speed, High-Speed, and Express Elevators 5. Freight Elevators 6. Facade Elevators 7. Hydraulic Elevators 8. Hydraulic Elevator Drives 9. Hydraulic Elevator Calculations 10. Escalators 11. Cable Cars 12. Platforms 13. Maintenance, Servicing, and Testing of Elevators 14. Modernization of Elevators 15. European Directives on Elevators
Learning outcomes: (Knowledge; Skills; Competencies)	Through lectures, tutorials and practical work, students should acquire the necessary knowledge and experience for practical application in the field of design, selection, management, and maintenance of vertical transport systems.
Sustainable Development Goal (SDG):	SDG7: Ensure Access to Reliable, Sustainable, and Modern Energy at Affordable Prices for All SDG9: Build Resilient Infrastructure, Promote Inclusive and Sustainable Industrialization, and Foster Innovation SDG11: Make Cities and Human Settlements Inclusive, Safe, Resilient, and Sustainable
Teaching methods:	Lectures, tutorials and preparation of seminars with a practical focus.
Assessment methods with grading structure:	Evaluation and grading of students during the course are carried out as follows: • Attendance at lectures and exercises: 0 – 10 points (%) • Homework/seminar papers/practical work: 0 – 10 points (%) • First partial exam/test/knowledge check: 0 – 15 points (%) • Second partial exam/test/knowledge check: 0 – 20 points (%) The total number of points (%) that a student can achieve based on the above criteria during the course is a maximum of 55 points (%). The final exam is worth up to 45 points or 45 (%). The final exam covers the entire material studied during the course.
Literature:	Required: 1. Šelendić B., Vertikalni, kosi i horizontalni transport, Delta pres, Beograd 1973. 2. Strakosch G., Vertical transportation, New Jersey, 2010. Supplementary: 1. European Standards EN 81, EN 115. 2. Regulations and Directives on Elevators

Course code:	**Course title:**

21TRTOS010305		TECHNOLOGY MARKETING	
Level: I	**Year: III**	**Semester: V**	**Number of ECTS credits:** 6 **Practical Work:** 2 ECTS
Status: Mandatory Course		**Total number of contact hours: 90** Optionally detail the distribution of hours by type:	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course**		
Prerequisite for enrollment:	No		
Course goal (goals):	Students should acquire the necessary knowledge and experience for practical application in the field of high-tech marketing through the instructional process, including lectures, exercises, laboratory work, and practical work.		
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Traffic as a Field of Material Production: Conceptual Understanding of Traffic. 2. Social Division of Labor in the Transport Market: Marketing as the Conceptual Foundation of Market Business. 3. Concept, Definition, and Development of Marketing. The Role and Importance of Marketing in Market Operations and the Formation of Business Policy in Transport Companies, High-Tech Marketing. 4. Basic Elements of the Marketing Mix in Transport Companies, Additional Tools of High-Tech Marketing. 5. Characteristics of the Transport Market as the Basis for Formulating Business Policy in Transport Processes. 6. Organization and Methods of Determining Market Elements for Business Policy Planning. Methods of Forecasting and Planning Business Policy in Transport Companies. 7. Organization of the Marketing Function in Transport Companies. 8. Costs and Prices as Instruments of Marketing Business Policy in Transport Companies. 9. Selection and Management of Marketing Channels in Transport. 10. Management of Service Operations and Additional Services. 11. Creating a Communication and Promotional Marketing Strategy. 12. Creating Direct Marketing Programs in Transport Systems. Planning the Marketing Function in Transport Companies. 13. Organization and Application of the Marketing Function in Transport Companies. 14. Evaluation and Control of the Marketing Function Execution in Transport. 15. Developing, Testing, and Launching New Services in Transport.		
Learning outcomes:	Knowledge: Theoretical and practical knowledge in the field of high-tech marketing in transport. The subject should ensure a level of competence and knowledge necessary for solving everyday problems in this area. Skills: The ability to apply theoretical and practical knowledge in the field of high-tech marketing in transport. Competencies: The ability to independently understand and use knowledge needed to solve specific problems in the field of high-tech marketing in transport.		

Sustainable Development Goal (SDG):	SDG 4 – "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all." SDG 5 – "Achieve gender equality and empower all women and girls." SDG 8 – "Promote sustained, 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 10 – "Reduce inequality within and among countries." SDG 11 – "Make cities and human settlements inclusive, safe, resilient, and sustainable."
Teaching methods:	Instruction is delivered through lectures, exercises, laboratory work/fieldwork/practical sessions/workshops. The following methods are employed: oral presentation, discussion, demonstration, graphical work, drawing, and group work. In lectures, theoretical concepts and principles are covered, accompanied by descriptive examples and problem-solving tasks. Additional examples are discussed and resolved through exercises, laboratory work/fieldwork/practical sessions, which allows for continuous work and preparation for independent problem-solving. In laboratory work/fieldwork/practical sessions/workshops, skills necessary for individual and team work are developed to accomplish tasks in the given field.
Assessment methods with grading structure:	Assessment includes creativity in lectures and exercises, as well as the evaluation of independent work, partial tests during the course, and the final exam. The criteria for tracking and evaluating student performance 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 (Comprehensive): 85 points (%), passed if more than 50% is achieved. The total number of points (%) a student can earn during the course amounts to a maximum of 50 points (%), which combined with the Final (Second Partial) makes up 100 points (%). For students who have not passed the First Partial Exam, the Final Exam (Comprehensive) is organized covering all material from lectures and exercises, and is worth 85 points (%), combined with the seminar/practical work to total 100 points (%). The final grade after all forms of knowledge assessment is evaluated according to the following grading system: • 10 (A): Outstanding performance with no or negligible errors, 95-100 points. • 9 (B): Above average, with a few errors, 85-94 points. • 8 (C): Average, with noticeable errors, 75-84 points. • 7 (D): Generally good, but with significant deficiencies, 65-74 points. • 6 (E): Meets minimum requirements, 55-64 points.

	• 5 (F, FX): Does not meet minimum requirements, less than 55 points. The overall evaluation of student obligations during the semester, and the exam grade is based on the total number of points (%) earned by the student from completing pre-exam obligations and taking the partial and final exams, with a maximum of 100 points, assessed 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: 1. Š. Čekić, I. Bošnjak : Tehnologijski marketing u transportu i komunikacijama, Univerzitet u Sarajevu, Fakultet za saobraćaj i komunikacije, Sarajevo, 2011. 2. I. Bošnjak: Tehnologijski marketing, Fakultet prometnih znanosti, Zagreb, 1996. 3. P.Kotler: Upravljanje marketingom, Zagreb,2006. 4. B.Tihi : Istraživanje marketinga,Sarajevo,2007. 5. Š. Čekić, I. Bošnjak: Menadžment u transportu i komunikacijama, Fakultet za saobraćaj i komunikacije- Fakultet prometnih znanosti, Sarajevo-Zagreb, 2000. 6. Grupa autora- B.Tihi: Osnovi marketinga, Sarajevo,1999.

Course code: 22TRTOS010305	**Course title:** INTELLIGENT TRANSPORT SYSTEMS		
Level: I	**Year: III**	**Semester: V**	**Number of ECTS credits: 6**
Status: Mandatory Course		**Total number of contact hours: 90** Optional breakdown of hours by type: Lectures 45 Tutorials 30 Seminars 15	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course**		
Prerequisite for enrollment:	None.		
Course goal (goals):	Acquiring the knowledge and skills necessary in the realization of programs in the field of intelligent transport systems, analysis of the effect of ITS functionality on changes in the state parameters of the classical transport system. Use of ITS functionality in the management of traffic processes.		
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into*	1. Defining basic concepts and the role of ITS 2. Scientific and technological framework of ITS development 3. Artificial intelligence in the ITS system 4. Measuring the performance and benefits of ITS 5. Architecture of ITS		

account the specificities of organizational units)	6. European ITS architecture 7. Intelligent vehicles 8. Intelligent transport infrastructure 9. Intelligent terminals 10. Intelligent cargo and transport equipment 11. Standardization of Functional Areas of ITS 12. Communication technologies in the ITS system 13. Digitization of transport 14. Planning and managing the development of the ITS system 15. Security and protection of the ITS system
Learning outcomes:	Knowledge: The Intelligent Transport Systems subject should provide the necessary level of knowledge about technologies, functions and students of ITS, methods of their planning, development and implementation. Skills: The ITS subject enables the acquisition of skills necessary for measuring, analyzing and evaluating the efficiency, safety, environmental impact and economic benefits of the implementation of ITS services. Competences: Through the teaching process of lectures, exercises, and seminar work, students should acquire appropriate competencies for designing, developing and managing intelligent transport systems.
Sustainable Development Goal (SDG):	"SDG3 - Health and well-being"; "SDG 9 Industry, innovation and infrastructure", "SDG11- Sustainable cities and communities", SDG 13- Climate protection"
Teaching methods:	Lectures, exercises and seminar work.
Assessment methods with grading structure:	1. Attendance at classes and semester work 15 points 2. First knowledge test 35 points 3. Final knowledge test 50 points
Literature:	Mandatory: 1. Ezgeta, D.: Intelligent transport systems, Faculty of traffic and communications of the university in Sarajevo, Sarajevo, 2018. 2. Bošnjak, I. : Intelligent transport systems, University of Zagreb, Faculty of Transport Sciences, Zagreb, 2006. Supplementary: 1. Ghosh, S., Lee, T.: Intelligent Transportation Systems – New Principles and Architectures, CRC Press, London, 2000. 2. Miles, J. Chen, K.: ITS Handbook, 2nd edition, PIRAC, 2004. 3. Meng Lu: Evaluation of Intelligent Road Transport Systems – Methods and Results. Institution of Engineering and Technology, London. 2016. 4. Meneguette, R.I., De Grande, R., Loureiro, A. F.: Intelligent Transport System in Smart Cities, Springer, Ontario, 2018. 5. Sładkowski, A.: Wiesław Pamuła: Intelligent Transportation Systems – Problems and Perspectives, Springer, Katowice, 2016. 6. Perallos, A.: Intelligent transport systems – technologies and applications. Wiley & Sons, Bilbao, 2016. 7. Chow, Y.J.: Informed urban transport systems, Elsever, Amaterdam, 2018.

	8. Dimitrakopoulos, G., Uden, L.: The Future of Intelligent Transport Systems, Elsever, Amaterdam, 2020.

Subject code: 23TRTOS010305	**Subject name:** ROAD TRAFFIC INFRASTRUCTURE		
Level: I	**Year: III**	**Semester: V**	**No. of ECTS credits: 6**
Status: Mandatory Course		**Total number of hours: 90** Distribution of hours by class type: Lectures: 45 Tutorials 30 Practical exercises: 45	
Classes participants	**Academic staff and associates selected in the field to which the course belongs/course**		
Prerequisite for enrolment:	NO		
Course objective(s):	To acquire educational and practical knowledge in road infrastructure area through teaching process that includes lectures, practical exercises and preparation of practical paper, with the aim of ensuring the required level of knowledge about the design, construction, maintenance and management of road traffic infrastructure.		
Thematic units:	1. Fundamentals of road traffic infrastructure; 2. Road network in Bosnia and Herzegovina; 3. Operating characteristics of roads; 4. Impact of vehicles on roads; 5. Elements of road cross-sections; 6. Road alignment/tracing and designing; 7. Lower and upper layer of road structure; 8. Road drainage; 9. Urban road network; 10. Same level and different elevation road junctions; 11. Road junction permeability; 12. Accompanying facilities on roads; 13. Road maintenance; 14. Transport and economic significance of road construction; and 15. Regulator and road infrastructure management models		
Learning outcomes:	Knowledge: Theoretical and practical knowledge of road infrastructure. Fundamental/underlying legislation, standards, rules, methods and procedures related to road infrastructure. Skills: Ability to apply theoretical and practical knowledge in the area of road traffic infrastructure for the purpose of establishing an efficient, effective, and environmentally friendly road infrastructure, using software tools. Competences: Ability to independently comprehend and apply legislation, standards, specialised literature and apply methods and procedures, measurements and researches, develop analyses, prepare evaluations and practical solutions for the purpose of further improvement in planning and operation of road infrastructure.		
Sustainable development goals	SDG4 – Good-quality education SDG5 – Gender equality		

<table>
<tr><td>(SDG):</td><td>SDG8 – Decent work and economic growth
SDG9 – Industry, innovations and infrastructure
SDG11 – Sustainable cities and local communities
SDG12 – Sustainable consumption and production
SDG13 – Climate protection
SDG17- Reaching goals through partnerships</td></tr>
<tr><td>Teaching methods:</td><td>Oral presentation with an overview of different traffic situations using video and audio recordings and independent presentation of individual practical road infrastructure problems, using specific examples.
Initiating debates and discussions on practical problems, individual observations from different situations, preparation of individual project tasks and studies for road infrastructure upgrading.</td></tr>
<tr><td>Examination methods with marking structure:</td><td>Assessment of creativity in classes and practical exercises along with preparation of independent papers, partial test assessment during the courses, and final examination grade. The criteria to monitor students' work and assessing it throughout the course are as follows:
- Seminar paper 15 points (5); passed in case above 50% successful; and
- Partial Exam/test/knowledge check/35 points (%), passed in case above 50% successful;
- Final Exam (II Partial Exam) 50 points (%), passed in case above 50% successful;
- Final Exam (Integral Exam) 85 points (%), passed in case above 50% successful.

The total number of points (%) a student may achieve based on the above assessment amounts to a maximum of 50 points (%), which makes a total of 100 points (%) with the Final Exam (II Partial Exam). For students who fail I Partial Exam, the Final Exam (Integral Exam) organised will cover all subject content, including lectures and practical exercises, and is evaluated with total of 85 points (%). Together with the seminar paper/practical work, it makes a total of 100 points (%). The final student success after all the prescribed forms of knowledge assessment is evaluated and graded is as follows:
a) 10 (A) - exceptional success without any errors or with minor errors, 95-100 points earned;
b) 9 (B) – above average with some errors, 85-94 points earned;
c) 8 (C) – average, with noticeable errors, 75-84 points earned;
d) 7 (D) – generally good, but with significant deficiencies, 65-74 points earned;
e) 6 (E) – meets the minimum requirements, 55-64 points earned;
f) 5 (F, FX) – fails to meet the minimum requirements, less than 55 points earned.

The overall assessment of all student's obligations during a semester, i.e. the grade following the examination, is based on a total number of points (%) earned by the student by fulfilling the pre-examination requirements and by passing the Partial and the Final Exams, and based on the quality of acquired knowledge and skills. It amounts to a maximum of 100 points that are established based on the following criteria:
<table>
<tr><td>Student obligation</td><td>Points (%)</td></tr>
<tr><td>Attendance at lectures and practical exercises (minimum 80% attendance at all forms of classes is mandatory and it is a precondition for obtaining signature/certification of</td><td>0 points</td></tr>
</table>
</td></tr>
</table>

	regular attendance) | Seminar | 15 points (%) I Partial Exam/Test/Knowledge check | 35 points (%) Final Exam (II Partial Exam) | 50 points (%) Final Exam (Integral Exam) | 85 points (%)
Reading list/ Literature:	Mandatory: 1. Božičević, J., Roads I and II, Faculty of Transport and Traffic Sciences, 1993. 2. Božičević, J., Topolnik, D., Permeability of Multi-Sided Roads, Scientific Council for Traffic HAZU, Zagreb, 1992. 3. Bublin, M., Traffic and Roads Planning, Sarajevo 2007. 4. Bublin, M., Functional Characteristics of Roads, Sarajevo 2012. 5. European Green Deal (2019). 6. Klemenčić, A., Designing Off-Level Road Junctions, Faculty of Transport and Traffic Sciences Zagreb, 1992. 7. Maletin, M., Planning and Designing Urban Roads, Belgrade 2005. 8. Mazić, B., Lovrić, I., Roads, Faculty of Civil Engineering Sarajevo, 2009. 9. Mazić, B., Lovrić, I., Roads, Sarajevo, 2010. 10. Guidelines for Designing, Construction, Maintenance, and Supervision of Roads, Sarajevo/Banja Luka 2005. 11. Sustainable and Smart Mobility Strategy EU (2020). 12. Sustainable and Smart Mobility Strategy -Western Balkans (2021). Supplementary/Non-mandatory: 1. Action plans for Road, Transport Community 2. Branković, N., Džaferović S., Road Traffic Infrastructure – Script, Faculty for Traffic and Communication Sarajevo, 2018. 3. Road Classification Criteria 4. Framework Transport Policy for BiH 2015-2030 5. Framework Transport Strategy for BiH 2016-2030 6. Road infrastructure-related Rulebooks resulting from the Law on Fundamentals of Traffic Safety on the Roads in BiH 7. Road Action Plan for the Western Balkans (2020). 8. Road Safety Manual, PIARC - World Road Association 9. EU Regulation 1315/2013, EU Directive 2019/1936, 2004/54 etc. 10. Law on Roads of the FBiH 11. Law on Expropriation 12. Law on Concessions 13. Law on Fundamentals of Transport Safety on the Roads in BiH 14. Law Spatial Planning and Land Use at the Level of FBiH

Course code: 24-25-1TRTES010305	**Course title:** TECHNICAL EXPLOITATION OF ROAD VEHICLES		
Level: I	**Year: III**	**Semester: V**	**Number of ECTS credits: 6**
Status: Elective Course		**Total number of contact hours: 90** Lectures 45 Exercises 25 Seminar 10 Practice 10	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course**		

Prerequisite for enrollment:	No
Course goal (goals):	Mastering knowledge about the rational exploitation of road vehicles and means of transport work in the transport economy. Analysis and calculation of the technical- exploitation characteristics of the vehicle, the knowledge of which represents the basis for choosing the optimal vehicle for certain conditions of exploitation. Installation of dynamic models of road vehicles in the process of traction and braking, movement in curves, stability and passability of road vehicles, in order to determine the necessary data for traffic accident experts as well as the process of traffic safety management.
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Basics of terramechanics 2. Wheel rolling. General case of driving wheel rolling 3. Adhesion coefficient. Adhesion force. Wheel slippage. Rolling wheel under lateral force 4. Weight distribution and center of gravity coordinates 5. Resistance forces during the movement of road vehicles 6. Determination of total soil reactions on vehicle axles. 7. Limit performance of road vehicles 8. Traction speed - characteristics of road vehicles 9. Differential equation of motion of the vehicle 10. Braking process of road vehicles. 11. Theoretical parameters of the braking process. Actual braking process. Distribution of braking forces on vehicle axles. 12. Stability of road vehicles 13. Turning a car on a diagonally inclined road 14. Economy of fuel consumption 15. Vehicle passability
Learning outcomes:	Knowledge: Knowledge of the basic laws of road vehicle movement - vehicle dynamics in different conditions of exploitation. Skills: Ability to evaluate the technical operational characteristics of vehicles. Setting up a dynamic vehicle model for calculating the necessary data on the kinematic and dynamic characteristics of the vehicle before and after the traffic accident. The ability to recognize the basic characteristics of scientific research . Ability to communicate conclusions and the reasons that led to them. Competencies: Through the teaching process of lectures, exercises, seminars and professional practice, the student will be able, based on the acquired knowledge, to: – Correctly approach the selection of the optimal vehicle for certain conditions of exploitation, that is, to assess to what extent the technical-operational characteristics of the given vehicle satisfy the given conditions of exploitation. – Analyzes and evaluates the dynamic characteristics of a vehicle from the aspect of traction and braking, stability, passability and fuel economy of one vehicle or to compare the specified characteristics of different vehicles. – Based on the traffic accident data, set up a dynamic model of the vehicle and calculate the necessary data on the kinematic and dynamic characteristics of the vehicle before and during the traffic

	accident. – Uses technical literature, manuals and tables from this field. – Monitors and acquires knowledge from professional subjects related to road traffic safety.
Sustainable Development Goal (SDG):	SDG3 – Good health and wellbeing, SDG9 – Industry, Innovations and Infrastructure
Teaching methods:	– Independent presentation – Discussion – Analysis of examples from practice (assignments, seminar papers)
Assessment methods with grading structure:	Assessment of creativity in classes and exercises with the creation of independent works, assessment of the partial test during the class as well as the assessment of the final exam. Criterion monitoring the work and evaluating the student during classes, according to the following method: – Homework/seminar work/practical work/ 15 points (%), passed if over 55% is won. – I Partial exam/test/knowledge check/35 points (%), passed if more than 55% is won. – Final exam (II Partial) 50 points (%), passed if over 55% is won. – Final exam (Integral) 85 points (%), passed if more than 55% is won. The total number of points (%) that a student can achieve according to the mentioned monitoring during classes is a maximum of 50 points (%), which with the Final (II partial) 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 testing, is evaluated and graded by the grading system as follows: 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 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. 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 pre-exam obligations and passing the partial and final exam, and according to the quality of acquired knowledge and skills, and contains a maximum of 100 points, and is determined according to the following scale: Student obligations _____Points (%) Attendance at lectures and exercises.....80 (%) Assignment/Seminar/Practice/.....15 points (%) I Partial exam/Test/Knowledge check/.....35 points (%)

	Final exam (II Partial) .....50 points (%) Final exam (Integral) .....85 points (%)
Literature:	Mandatory: 1. B.Pikula, S.Dacić, Fundamentals of Vehicle Dynamics, Faculty of Mechanical Engineering, Sarajevo, 2017. 2. S. Dacić, B. Pikula, M. Trobradović, Vehicle dynamics - collection of tasks, Faculty of Mechanical Engineering, Sarajevo, 2008. 3. R. Dučić, ABS Dynamics, Faculty of Traffic and Communications, Sarajevo, 1995. Supplementary: 1. D. Janković, Motor vehicles, Faculty of Mechanical Engineering, Belgrade, 1993. 2. D.Janković, J.Todorović, Theory of movement of motor vehicles, Faculty of Mechanical Engineering, Belgrade, 1983. 3. Jazar, NR :Vehicle Dynanics-theory and application, Dept. of Mechanical Engineering Manhattan College Riverdale, NY 10471 4. Dedović, V.: DinamIka vozila, University of Belgrade, Faculty of Traffic, Belgrade, 2004.

Course code: 24-25-2TRTES010305	**Course title:** MULTIMODAL TRANSPORT		
Level: I	**Year: III**	**Semester: V**	**Number of ECTS credits: 6**
Status: Elective Course		**Total number of contact hours: 90** **Lectures: 45** **Exercises: 30** **Seminar: 15**	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course**		
Prerequisite for enrollment:	Attendance and active participation in lectures and exercises are mandatory, as well as the preparation of a seminar paper and independent exercise tasks.		
Course goal (goals):	The course content should enable students to become familiar with modern transport chains, the basics of technological design and optimization of transport processes, as well as with contemporary technological solutions offered within individual multimodal transport technologies, and applying logistics principles and the possibilities provided by new information and telecommunication technologies.		
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Basic characteristics of modern technological changes in society, industry, and transport. 2. Transport chains. Classic transport chain technologies. Industrial transport. 3. Systemic approach to the analysis of the transport process as a complex technological system 4. Pallet transport system 5. Container transport system 6. Typical technologies for implementing the container transport chain 7. “Vehicle-to-Vehicle” systems 8. Integral land-sea transport systems. 9. Integral sea-river transport systems. Multimodal transport systems		

	in passenger transport. 10. Container terminals, HUCKE – PACK terminals, RO-RO terminals 11. Cargo transport centers (RTC) 12. Introduction of logistics principles into the planning of transport chains 13. Technological functions of the marketing logistics subsystem, logistics from the perspective of modern transport and forwarding organizations 14. Warehouse systems, inventory theory 15. Specific research and design of modern logistics and transport chains
Learning outcomes:	Through lectures, exercises, and practical work, students should acquire relevant knowledge and experience for practical application in the field of modern cargo transport technologies. The course also enables the acquisition of knowledge and skills necessary for adequate analysis, assessment, and management of transport flows based on logistics principles.
Sustainable Development Goal (SDG):	SDG 8: Decent Work and Economic Growth SDG 9: Industry, Innovation, and Infrastructure SDG 11: Sustainable Cities and Communities SDG 12: Responsible Consumption and Production SDG 14: Life Below Water
Teaching methods:	Teaching is conducted through lectures, exercises, and practical parts of the course, including project tasks. Lectures are delivered through oral presentations with examples from practice. Students will be required to prepare and present seminar papers and/or project tasks. Various methods are used in teaching, including oral presentations and discussions, demonstration of examples, graphical and video presentations, and group work using appropriate methodological approaches.
Assessment methods with grading structure:	Evaluation criteria and grading during the course are as follows: Attendance at lectures and exercises will be recorded; attendance is mandatory as a condition for taking the exam, with a maximum of 10% unexcused absences allowed. Regular attendance will not be awarded additional points. Homework/seminar paper/practical work is graded from 0 to 15 points, and only students who fulfill over 50% of these requirements will be evaluated. During the course, only one knowledge check will be organized – a partial exam in the 8th or 9th week of classes, worth 35 points, and only students who pass over 50% of this partial exam will be graded. The final exam is worth up to 50 points.
Literature:	Mandatory: 1. Dalla Chiara B., Ercolani F., Gačanin E., Kiso F.: Intermodal Transport, Education and Culture TEMPUS, Sarajevo 2004. 2. Perišić R.: Modern Transport Technologies I, Faculty of Traffic Engineering Belgrade, 1994. 3. Perišić R.: Modern Transport Technologies II, Faculty of Traffic Engineering Belgrade, 1995. 4. Marković I.: New Transport Technologies, Faculty of Traffic Sciences Zagreb, 1985. 5. Terminology in Combined Transport: UN/ECE, Translation Kiso F.,

	Education and Culture TEMPUS, Sarajevo, 2004. 6. Kiso F., Karičić S.: Teaching Materials, Presentations, and Script "Warehousing"

Course code: 24-25-3TRTES010305	**Course title:** ROAD TRAFFIC MONITORING AND REGULATION		
Level: I	**Year: III**	**Semester: V**	**Number of ECTS credits: 6**
Status: Elective Course		**Total number of contact hours: 75** Optional breakdown of hours by type: Lectures 45 Tutorials 30 Seminars 10	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course**		
Prerequisite for enrollment:	no		
Course goal (goals):	Acquisition of knowledge and skills necessary in the implementation of programs in the field of monitoring and regulation of road traffic, analysis of the effect of management functions on changes in road traffic parameters.		
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. The role and significance of monitoring and regulation in road traffic 2. Technologies of data collection and analysis in the road sector traffic 3. Management of operations on the road network 4. Traffic management centers 5. Relevant sizes of traffic flow for management road traffic 6. Traffic management on highways 7. Management of traffic flows on the city road network 8. Traffic management at intersections 9. Incident management on the road network 10. Designing light signals for regulating traffic on intersections 11. Signal plan of traffic light intersections 12. Capacity of signalized intersections 13. Service level of traffic light intersections 14. Coordination of the work of light signals 15. Traffic management in the ITS environment		
Learning outcomes:	Knowledge: The subject Supervision and regulation of road traffic should ensure the necessary level of knowledge about the methods and procedures of monitoring processes in road traffic and the creation and implementation of management functions in order to increase efficiency and safety in road traffic. Skills :The course enables the acquisition of skills necessary for measuring, analyzing and evaluating the impact of management functions and measures of supervision on the development of road traffic. Competences: Through the teaching process of lectures, exercises, and seminar work, students should acquire appropriate competencies for designing, developing and using methods of monitoring and managing		

	processes in road traffic.
Sustainable Development Goal (SDG):	SDG3 - Health and well-being SDG 9 - Industry, innovation and infrastructure SDG11- Sustainable cities and communities SDG 13- Climate protection
Teaching methods:	Lectures, exercises and seminar work
Assessment methods with grading structure:	1. Attendance at classes and semester work 15 points 2. First knowledge test 35 points 3. Final knowledge test 50 points
Literature:	Mandatory: 1. Ezgeta, D: Supervision and management of road traffic, Faculty of Transport and Communications of the University of Sarajevo, Sarajevo, 2024. Supplementary: 1. Croft, Guide to traffic management, Part 1: Introduction to traffic management, Sydney, Australia: Austroroads, 2009. 2. M. Dalgleish, and N. Hoose, Highway Traffic Monitoring and Data Quality, London: Artech House, 2008. 3. J. Barcelo and M. Kuwahara, Traffic Data Collection and its Standardization, London: Springer, 2010. 4. J.C. Falcocchio, S. Levinson, Road Traffic Congestion: A Concise Guide, London: Springer, 2015. 5. K. Ozbay, P. Kachroo, Incident management in intelligent transportation systems, Boston: Artech House, 1999. 6. Ni, Signalized Intersections-Fundamentals to Advanced Systems, Cham, Switzerland : Springer Nature Switzerland AG, 2020. 7. MUTCD Manual of Uniform Traffic Control Devices, Washington: Federal Highway Administration, 2009. 8. 8. N. Čelar, S. Stanković, J. Kajalić, Fundamentals of management 9. by light signaling, Belgrade, University of Belgrade, Faculty of Traffic, 2020. 10. A. Ferrara, S. Sacone, and S. Siri, Freeway Traffic Modeling and Control, Cham, Switzerland: Springer, 2018. 11. L. Deka, M. Chowdhury, Transportation Cyber-Physical Systems, Amsterdam: Elsevier, 2018.

Course code: 27TRTOS010306	**Course title:** ROAD TRAFFIC SAFETY		
Level: I	**Year: III**	**Semester: VI**	**Number of ECTS credits: 6**
Status: Mandatory Course		**Total number of contact hours: 90**	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course**		
Prerequisite for enrollment:	None		
Course goal (goals):	Acquiring educational, theoretical and practical knowledge in the implementation of road traffic safety programs, finding and analysing road traffic safety indicators.		
Topics covered (Units of study):	1. Introduction – Basics of Road Traffic Safety 2. Laws and Regulations in Traffic Safety		

(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)	3. Elements of Traffic Safety 4. Psycho - physical characteristics of road users 5. Elements of Infrastructure 6. Safety in Transport Elements of Motor Vehicle Safety 7. Elements of the safety of the road infrastructure environment 8. Analyses of vehicle movement for safe movement and participation in traffic 9. Analyses of motorcycle movement for safe movement and participation in traffic 10. Analyses of pedestrian movement for safe movement and participation in traffic 11. Analyses of bicycle and scooter movement for safe movement and participation in traffic 12. Elements of Traffic Accidents 13. Road Traffic Safety Indicators 14. Prevention and Campaigns to Improve Road Safety
Learning outcomes:	Knowledge: Theoretical and practical knowledge in the field of road safety. Basic regulations, rules, methods and procedures in the field of traffic prevention, analysis and road traffic safety management systems. Skills: Ability to apply theoretical and practical knowledge in the field of road traffic safety in the function of road traffic safety management. Competencies: Ability to independently understand and use regulations, use professional literature, apply methods and procedures, measure research indicators, make analyses, assessments and practical solutions in the function of managing and improving road traffic safety.
Sustainable Development Goal (SDG):	SDG4 – Quality Education SDG8 - Decent Work and Economic Growth SDG9- Industry, Innovation and Infrastructure SDG11 - Sustainable Cities and Local Communities SDG17- Partnerships for the Goals
Teaching methods:	Oral presentation with presentation and presentation of various systems and processes in the field of road traffic safety with the use of video and audio recordings, and independent presentation of certain specific problems of road traffic safety in a specific field of research. Initiating discussions and discussions on problems from practice, individual observations from different environments. Independent research and analysis in the field of road traffic safety within the laboratory, on field conditions and other specific conditions of production and service processes.
Assessment methods with grading structure:	Assessment of creativity in classes and exercises with the preparation of independent papers, evaluation of the partial test during the class as well as the evaluation of the final exam. The criterion for monitoring the work and evaluation of the student during the course of the course is as follows: – Seminar 15 points (%), passed if won over 50%. – I Partial exam/test/knowledge test/35 points (%), is passed if more than 50% is scored. – Final exam (II Partial) 50 points (%), passed if won over 50%. – Final exam (Integral) 85 points (%), passed if won over 50%.

<table>
<tr>
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<td>The total number of points (%) that a student can achieve during the course is a maximum of 50 points (%), which together with the Final (II partial) makes 100 points (%). For students who have not passed the I 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 paper/practical work makes 100 points (%).

The final success of the student after all the foreseen forms of examination is evaluated and evaluated by the grading system as follows: a) 10 (A) - exceptional success without errors or with minor errors, carries 95-100 points; b) 9 (B) - above average, with some error, carries 85-94 points; c) 8 (C) - average, with noticeable errors, carries 75-84 points; d) 7 (D) - generally good, but with more significant drawbacks, 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.
The total evaluation of all student obligations during the semester, i.e. the grade on the exam, is based on the total number of points (%) that the student has acquired by fulfilling the pre-exam obligations and passing the partial and final exam, according to the quality of the acquired knowledge and skills, and contains a maximum of 100 points, and is determined according to the following scale:
<table>
<tr><td>The Student's Responsibilities</td><td>Score (%)</td></tr>
<tr><td>Attendance at lectures and exercises
(attendance at all forms of teaching is mandatory at least 80% and this is a condition for the certification/signature of regular attendance)</td><td>0 points</td></tr>
<tr><td>Seminar</td><td>15 points (%)</td></tr>
<tr><td>I Partial Exam / Test / Knowledge Assessment /</td><td>35 points (%)</td></tr>
<tr><td>Final exam (II partial)</td><td>50 points (%)</td></tr>
<tr><td>Final exam (Integral)</td><td>85 points (%)</td></tr>
</table>
</td>
</tr>
<tr>
<td>Literature:</td>
<td>Mandatory:
1. Lindov, O., Sigurnost u cestovnom saobraćaju, Fakultet za saobraćaj i komunikacije Univerziteta u Sarajevu, Sarajevo, 2008.
2. Lindov, O., Priručnik o poznavanju elemenata i pravila sigurnosti saobraćaja na putevima – licenca za predavača i ispitivača, Fakultet za saobraćaj i komunikacije Univerziteta u Sarajevu, Institut za saobraćaj i komunikacije , Sarajevo, 2009.
3. Lindov, O., Saobraćajna kultura, Fakultet za saobraćaj i komunikacije Univerziteta u Sarajevu, Sarajevo, 2012.
4. Lindov, O., Omerhodžić, A. Sigurnost u cestovnom saobraćaju - skripta zadataka, testovi za polaganje, Fakultet za saobraćaj i komunikacije Univerziteta u Sarajevu, Sarajevo, 2013.
5. Lindov, O., Omerhodžić, A. Sigurnost u cestovnom saobraćaju - skripta predavanja, Fakultet za saobraćaj i komunikacije Univerziteta u Sarajevu, Sarajevo, 2013.
6. Lindov, O., Priručnik za jačanje kapaciteta profesije bezbjednosti saobraćaja, Fakultet za saobraćaj i komunikacije Univeziteta u</td>
</tr>
</table>

	Sarajevu, Erasmus+ projekat Trafsaf, Sarajevo, 2020. 7. Rotim, F., Elementi sigurnosti cestovnog prometa, Svezak 1, Ekspertize prometnih nezgoda, Suvremeni promet, Zagreb, 1990. Supplementary: 1. Cerovec, V., Tehnika i sigurnost cestovnog prometa, Fakultet prometnih znanosti, Zagreb, 2001. 2. Dragač, R., Bezbednost drumskog saobraćaja, Knjiga I,II,III, Saobraćajni Fakultet, Beograd, 1982.,1983.,1994. 3. Golubić, J., Osnove tehnike i sigurnosti prometa. Fakultet prometnih znanosti, Zagreb, 1999. 4. Lindov, O., Čaušević, S., Omerhodžić, A., Bjelica, D., Metodologija ispitivanja validnosti softverskih aplikacija za analizu prometne nezgode, Suvremeni promet, Zagreb, 2011. 5. Lindov, O., Kazivanja o saobraćaju – Hronologija odabranih kazivanja u medijima 2002-2012, Institut za saobraćaj i komunikacije, Udruženje inžinjera u Bosni i Hercegovini, Sarajevo, 2013. 6. Milošević, S., Teorije saobraćajnih nezgoda, Saobraćajni fakultet, Beograd,1994. 7. Rotim, F., Elementi sigurnosti cestovnog prometa, Svezak 2, Kinetika vozila, Suvremeni promet, Zagreb, 1991. 8. Rotim, F., Elementi sigurnosti cestovnog prometa, Svezak 3, Sudari vozila, Suvremeni promet, Zagreb, 1992. 9. Vujanić, M., Zbirka rešenih zadataka iz bezbednosti saobraćaja, Saobraćajni Fakultet, Beograd, 1991.

Course code: 28TRTOS010306	**Course title:** ROAD TRANSPORT TECHNOLOGY		
Level: I	**Year: III**	**Semester: VI**	**Number of ECTS credits: 6**
Status: Mandatory Course		**Total number of contact hours: 90**	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course**		
Prerequisite for enrollment:	None		
Course goal (goals):	Acquiring practical knowledge in the implementation of programs in road transport technology, and the ability to make practical analyses of the existing situation, technical and exploitation parameters of the vehicle fleet, as well as proposals for measures to improve the operation of the vehicle fleet.		
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Introduction – basics of road transport technology 2. Basic Laws and By-Laws in Domestic and International Road Freight and Passenger Transport 3. Forms of organization of transport enterprises 4. Transport routes in the organization of road transport of passengers and freight 5. Technical characteristics of means of transport 6. Elements and coefficients of fleet operation 7. Elements and coefficients of the time balance of the work of the vehicle fleet		

	8. Methods for calculating the transport work and the total passengers and cargo carried 9. Methods for calculating the mileage of the vehicle fleet 10. Analysis of the productivity of the vehicle fleet 11. Analysis of the productivity of the driving according to the behavior of individual parameters 12. Fleet Transport Cost Analysis 13. Analysis of the cost of transport services 14. Coordination of vehicle movement and operation of loading and unloading stations 15. Methods of forming a transport network on the execution of a transport task
Learning outcomes:	Knowledge: Theoretical and practical knowledge in the field of road transport technology. Basic regulations, rules, methods and procedures in the field of organization of transport tasks, analysis of technical and exploitation parameters, as well as improvement in the execution of transport tasks. Skills: Ability to apply theoretical and practical knowledge in the field of road transport technology in the function of efficient and effective implementation of transport tasks. Competencies: Ability to independently understand and use regulations, use professional literature, apply methods and procedures, measure and research, make analyses, assessments and practical solutions in the function of realization and further improvement in planning and realization of a transport task.
Sustainable Development Goal (SDG):	SDG4 – Quality Education SDG8 - Decent Work and Economic Growth SDG11 - Sustainable Cities and Local Communities SDG12-Sustainable consumption and production COR13 - Climate Action SDG17 - Partnerships for the Goals
Teaching methods:	Oral presentation with presentation and presentation of various systems and processes in the field of road transport technology with the use of video and audio recordings, and independent presentation of certain specific technological problems in a specific field of research. Initiating discussions and discussions on practical problems, individual observations from different environments, making independent research and analyses in road transport technology, on practical examples and other specific conditions.
Assessment methods with grading structure:	Assessment of creativity in classes and exercises with the preparation of independent papers, evaluation of the partial test during the class as well as the evaluation of the final exam. The criterion for monitoring the work and evaluation of the student during the course of the course is as follows: – Seminar 15 points (%), passed if won over 50%. – I Partial exam/test/knowledge test/35 points (%), is passed if more than 50% is scored. – Final exam (II Partial) 50 points (%), passed if won over 50%. – Final exam (Integral) 85 points (%), passed if won over 50%. The total number of points (%) that a student can achieve during the course is a maximum of 50 points (%), which together with the Final (II partial) makes 100 points (%). For students who have not passed the I 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 paper/practical work makes 100 points (%).

The final success of the student after all the foreseen forms of examination is evaluated and evaluated by the grading system as follows: a) 10 (A) - exceptional success without errors or with minor errors, carries 95-100 points; b) 9 (B) - above average, with some error, carries 85-94 points; c) 8 (C) - average, with noticeable errors, carries 75-84 points; d) 7 (D) - generally good, but with more significant drawbacks, 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.
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The Student's Responsibilities	Score (%)
Attendance at lectures and exercises (attendance at all forms of teaching is mandatory at least 80% and this is a condition for the certification/signature of regular attendance)	0 points
Seminar	15 points (%)
I Partial Exam / Test / Knowledge Assessment /	35 points (%)
Final exam (II partial)	50 points (%)
Final exam (Integral)	85 points (%)

Literature:

Mandatory:

1. Adamović , A., Uvod u saobraćaj, Saobraćajni fakultet Beograd, 2000.
2. Ahmetagić, E., Organizacija preduzeća, Čikos holding Subotica, 1999.
3. Lindov, O., Tehnologija cestovnog transporta – Skripta predavanja, Fakultet za saobraćaj i komunikacije Sarajevo, 2013.
4. Lindov, O., Tehnologija cestovnog transporta – Skripta zadataka, testovi za polaganje, Fakultet za saobraćaj i komunikacije Sarajevo, 2013.
5. Lindov, O., Tehnologija drumskog transporta – Skripta zadataka, Fakultet za saobraćaj i komunikacije Sarajevo, 2007.
6. Jusufranjić, I., Javni gradski prijevoz putnika, Fakultet za saobraćaj i komunikacije Sarajevo, 2003.
7. S. Vukadinović: Transportni zadatak linearnog programiranja, Naučna knjiga, Beograd,1989.
8. Županović, I., Tehnologija cestovnog prijevoza, Fakultet prometnih znanosti Zagreb, 2002

Supplementary:

1. Jovanović, I., Zbirka rešenih zadataka iz organizacije i tehnologije drumskog transporta, Saobraćajni fakultet Beograd, 1997.
2. Perišić, R., Savremene tehnologije transporta II, Saobraćajni fakultet Beograd, 1995.
3. Putnik, N., Autostanice i Autobaze, Saobraćajni Fakultet Beograd, 2001.

	4. Štrumberger, N., Tehnologija materijala u prometu roba, Fakultet prometnih znanosti Zagreb, 1997. 5. Topenčarević, LJ., Organizacija i tehnologija cestovnog transporta, Građevinska knjiga, Beograd, 1987.

<table>
<tr><td>Course code:
29TRTOS010306</td><td colspan="3">Course title:
ROAD TRAFFIC PLANNING</td></tr>
<tr><td>Level: I</td><td>Year: III</td><td>Semester: VI</td><td>Number of ECTS credits: 6</td></tr>
<tr><td colspan="2">Status: Mandatory Course</td><td colspan="2">Total number of contact hours: 90</td></tr>
<tr><td>Course participants:</td><td colspan="3">Academic staff and associates selected in the field to which the course belongs/course</td></tr>
<tr><td>Prerequisite for enrollment:</td><td colspan="3">No</td></tr>
<tr><td>Course goal (goals):</td><td colspan="3">Acquiring educational forms in the implementation of programs in the field of road traffic planning . Acquiring knowledge and skills in road traffic planning .</td></tr>
<tr><td>Topics covered (Units of study):
(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)</td><td colspan="3">
<table>
<tr><th>Sn</th><th>Educational units</th><th>Number of hours (P+L+L+S+Sr)</th></tr>
<tr><td>1.</td><td>Basics of planning and designing in traffic and transport</td><td>3+2+1+2+2</td></tr>
<tr><td>2.</td><td>Basic elements of traffic and transportation systems in the city relevant for planning and design</td><td>3+2+1+2+2</td></tr>
<tr><td>3.</td><td>Basic elements of traffic and transport systems in the region and wider areas relevant for planning and design</td><td>3+2+1+2+2</td></tr>
<tr><td>4.</td><td rowspan="2">Demand for traffic and transportation services</td><td>3+2+1+2+2</td></tr>
<tr><td>5.</td><td>3+2+1+2+2</td></tr>
<tr><td>6.</td><td>Offer of services in traffic and transportation</td><td>3+2+1+2+2</td></tr>
<tr><td>7.</td><td rowspan="2">Methodological basis of planning in traffic and transportation</td><td>3+2+1+2+2</td></tr>
<tr><td>8.</td><td>3+2+1+2+2</td></tr>
<tr><td>9.</td><td>Preparation and creation of traffic plans</td><td>3+2+1+2+2</td></tr>
<tr><td>10.</td><td>New technologies for creating traffic and transportation plans</td><td>3+2+1+2+2</td></tr>
<tr><td>11.</td><td>Basics of design in traffic and transportation</td><td>3+2+1+2+2</td></tr>
<tr><td>12.</td><td>Basics of planning and designing terminals in traffic</td><td>3+2+1+2+2</td></tr>
<tr><td>13.</td><td>Costs of traffic and transport system service users</td><td>3+2+1+2+2</td></tr>
<tr><td>14.</td><td>Evaluation of plans and projects in traffic and transport</td><td>3+2+1+2+2</td></tr>
<tr><td>15.</td><td>Decision-making and management in planning and designing in traffic and transportation</td><td>3+2+1+2+2</td></tr>
</table>
</td></tr>
<tr><td>Learning outcomes:</td><td colspan="3">Through the teaching process of lectures, exercises and practical work, students should acquire appropriate knowledge related to traffic</td></tr>
</table>

	planning. Study and practical application should ensure the necessary level of knowledge to determine the characteristics of the state of traffic and transport systems on the road and street network, the forecast of transport requirements of individual and public modes of transport, the formation of variants of the development of traffic and transport systems on road Gad and non-urban roads, the evaluation of variants solutions and selection of the optimal plan for the development of the traffic and transport system, implementation and monitoring of the implementation of the plan.
Sustainable Development Goal (SDG):	SDG4: Quality education SDG9: Industry, innovation and infrastructure SDG11: Sustainable cities and communities SDG12: Responsible consumption and production SDG13: Climate action
Teaching methods:	Lectures, exercises and preparation of a seminar paper with a practical review. Analytical and demonstrative approach.
Assessment methods with grading structure:	Student work is monitored by assigning points for each form of activity and knowledge test during the semester, as well as on the final exam after the end of the semester according to the following monitoring elements: – Homework/seminar work/practical work/ 15 points (%), evaluated if over 50% is passed – 1st partial exam/1st test/1st knowledge test/35 points (%), evaluated if more than 50% are passed – Final exam (II Partial) 50 points (%), is evaluated if more than 50% are passed. – Final exam (Integral) 85 points (%), evaluated if more than 50% are passed. The total number of points (%) that a student can achieve according to the mentioned monitoring during classes is a maximum of 50 points (%), which with the Final (II partial) 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 students, after all the foreseen forms of knowledge testing, is evaluated and evaluated using the evaluation system as follows: a) 10 (A) - exceptional success without errors or with minor errors, carries 95-100 points; b) 9 (B) - above average, with some errors, carries 85-94.99 points; c) 8 (C) - average, with noticeable errors, carries 75-84.99 points; d) 7 (D) - generally good, but with significant shortcomings, carries 65-74.99 points; e) 6 (E) - meets the minimum requirements, carries 55-64.99 points; f) 5 (F, FX) - does not meet the minimum requirements, less than 55 points.
Literature:	Mandatory: 1. Mehanović, M., 2017. "Planning in traffic, transport and

	communications". Faculty of Traffic and Communications in Sarajevo, Sarajevo. 2. Padjen J.: Basics of traffic planning, Zagreb, 1986. Supplementary: 1. Padjen J.: Spatial-traffic planning methods, Economic Institute, Zagreb, 1978. 2. Mehanović, M., 2011. "Planning the offer of services in urban passenger traffic". Faculty of Traffic and Communications in Sarajevo, Sarajevo . 3. Mehanović, M.: "Tasks and examples from theory and practice in public urban passenger transport", Faculty of Traffic and Communications, Sarajevo, 2005. 4. Meyer, MD Miller, EJ: Urban Transportation Planning, McGraw-Hill, 1984. 5. Kuzović, Lj.; Topolnik, D.: Capacity of road traffic , Construction book Belgrade, 1989. 6. Jovanović N.: Traffic planning, Faculty of Traffic, Belgrade, 1990. 7. Jović J.: Traffic planning in cities-practicum, Faculty of Transportation, Belgrade, 1996. 8. HZDP Zagreb, Journals

Course code: 30-31-1TRTES010306	**Course title:** DIAGNOSTICS AND MAINTENANCE OF ROAD VEHICLES		
Level: I	**Year: III**	**Semester: VI**	**Number of ECTS credites: 6**
Status: Elective Course		**Total number of hours: 90** Optional breakdown of hours by type: Lectures 45 Tutorials 30 Laboratory tutorials 15	
Course participants:	Academic staff and associates selected in the field to which the course belongs/course		
Prerequisite for enrollment:	No		
Course goal (goals):	Acquisition of educational forms in the implementation of programs in diagnostics and maintenance of road vehicles, practical application of diagnostic devices, analysis of vehicle technical condition, and measurement of parameters.		
Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Introduction – Basics of Diagnostics and Maintenance of Road Vehicles 2. Classification and Identification of Vehicles 3. Technological Basics of Vehicle Maintenance 4. Changes in Vehicle Condition and Their Causes 5. Technological Basics of Diagnostics 6. Diagnostic Systems and Diagnostic Elements 7. Diagnostic Technology 8. Preventive Maintenance Technologies 9. Corrective Maintenance Technologies 10. Diagnostics and Maintenance of Engine Systems 11. Diagnostics and Maintenance of Vehicle Systems 12. Technical Inspection of Motor Vehicles		

	13. Vehicle Homologation 14. Vehicle Certification 15. Concluding Considerations on Diagnostics and Maintenance of Road Vehicles
Learning outcomes: (Knowledge; Skills; Competencies)	Through lectures, tutorials and practical work, students should acquire the necessary knowledge and experience for practical application in the field of diagnostics and maintenance of road vehicles. This will enable them to gain applicable knowledge and skills essential for working at technical inspection stations. By studying this material, students will achieve the required level of understanding of methods and procedures for vehicle diagnostics and maintenance. The content of this discipline provides the knowledge and skills necessary for application in vehicle certification and homologation, as well as for organizing and managing vehicle diagnostics and maintenance systems.
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 SDG12: Ensure sustainable consumption and production patterns SDG13: Take urgent action to combat climate change and its impacts
Teaching methods:	Lectures, tutorials and preparation of seminars with a practical focus.
Assessment methods with grading structure::	Evaluation and grading of students during the course are carried out as follows: – Attendance at lectures and exercises: 0 – 10 points (%) – Homework/seminar papers/practical work: 0 – 10 points (%) – First partial exam/test/knowledge check: 0 – 15 points (%) – Second partial exam/test/knowledge check: 0 – 20 points (%) The total number of points (%) that a student can achieve based on the above criteria during the course is a maximum of 55 points (%). The final exam is worth up to 45 points or 45 (%). The final exam covers the entire material studied during the course.
Literature:	Required: 1. Ahmić, A.; Klisura, F.: Dijagnostika i održavanje cestovnih vozila, Univerzitet u Sarajevu - Fakultet za saobraćaj i komunikacije, Sarajevo 2021.

Course code: 30-31-2TRTES010306	**Course title:** URBAN PUBLIC TRANSPORT		
Level: I	**Year: III**	**Semester: VI**	**Number of ECTS credites: 6**
Status: Elective Course		**Total number of contact hours: 90**	
Course participants:	Academic staff and associates selected in the field to which the course belongs/course		
Prerequisite for enrollment:	None		
Course goal (goals):	To acquire educational forms in the implementation of the public urban transport program. To gain knowledge and skills in public urban transport.		

Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Development of Urban Public Transport 2. Basics of Urban Public Transport 3. Research and Planning in Urban Public Transport 4. Transport Service User Demands in Urban Transport 5. Supply of Services in Urban Public Transport 6. Modeling in Urban Public Transport 7. Design of Urban Public Transport Systems 8. Structure of Urban Public Transport Systems 9. Line and Network of Lines. Modes of Transport and Vehicles 10. Timetable. Transport Management System 11. Fare System, Ticketing System, Payment System. Information System 12. Performance Indicators of Transport System. Selection of Transport System 13. Planning in Urban Public Transport Companies 14. Organization of Urban Public Transport Companies 15. Economic Aspects of Service Provision in Urban Public Transport
Learning outcomes: (Knowledge; Skills; Competencies)	Through lectures, tutorials and practical work, students should acquire the necessary knowledge related to the planning, organization and management of urban public transport. Study and practical application should ensure the required level of knowledge for the rational organization of passenger transport in urban public transport, in accordance with the traffic needs of users and the interest of the community and service providers. The goal is to enable students to properly address, plan and solve issues related to urban public transport in cities.
Sustainable Development Goal (SDG):	SDG4: Ensure inclusive and quality education, and promote lifelong learning opportunities for all people, of all ages SDG9: Industry, Innovation, and Infrastructure SDG11: Sustainable Cities and Communities SDG12: Responsible Consumption and Production SDG13: Climate Action
Teaching methods:	Lectures, tutorials and preparation of seminars with a practical focus. Analytical and demonstrative approach.
Assessment methods with grading structure:	Student performance is monitored by assigning points for each form of activity and knowledge assessment during the semester, as well as on the final exam after the end of the semester according to the following monitoring elements: – Homework/Seminar Paper/Practical Work: 15 points (%), evaluated if more than 50% is achieved – First Partial Exam/First Test/First Knowledge Check: 35 points (%), evaluated if more than 50% is achieved – Final Exam (Second Partial): 50 points (%), evaluated if more than 50% is achieved – Final Exam (Comprehensive): 85 points (%), evaluated if more than 50% is achieved The total number of points (%) that a student can achieve through the aforementioned monitoring during classes is a maximum of 50 points (%), which, combined with the Final (Second Partial) Exam, totals 100

	points (%). For students who did not pass the First Partial Exam, the Final Exam (Comprehensive) covers all the material covered during classes and exercises and is worth 85 points (%), which, combined with the seminar paper/practical work, totals 100 points (%). The final success of students after all the prescribed forms of knowledge assessment is evaluated and graded according to the following grading system: a) 10 (A) - Outstanding performance with no errors or only minor errors, earns 95-100 points b) 9 (B) - Above average, with some errors, earns 85-94.99 points c) 8 (C) - Average, with noticeable errors, earns 75-84.99 points d) 7 (D) - Generally good, but with significant shortcomings, earns 65-74.99 points e) 6 (E) - Meets the minimum requirements, earns 55-64.99 points f) 5 (F, FX) - Does not meet the minimum requirements, less than 55 points.
Literature:	Required: 1. Mehanović, M., 2011. „Planiranje ponude usluga u gradskom prometu putnika“. Fakultet za saobraćaj i komunikacije u Sarajevu, Sarajevo. 2. Mehanović, M.: “Zadaci i primjeri iz teorije i prakse u javnom gradskom prevozu putnika”, Fakultet za saobraćaj i komunikacije, Sarajevo, 2005. 3. Banković, R.: Planiranje javnog gradskog putničkog prevoza, IRO Građevinska knjiga, Beograd, 1984. Supplementary: 1. Mehanović, M., 2017. „Planiranje u saobraćaju, prevozu i komunikacijama “. Fakultet za saobraćaj i komunikacije u Sarajevu, Sarajevo. 2. Jović J.: Planiranje saobraćaja u gradovima- praktikum Saobraćajni fakultet, Beograd, 1996. 3. Vučić, V.: Urban Public Transportation, Sistems and Technology, Prentice Hall International England, 1981. 4. HZDP Zagreb, Časopisi

Course code: 30-31-3TRTES010306	**Course title:** TRANSPORT AND ENVIRONMENT		
Level: I	**Year: III**	**Semester: VI**	**Number of ECTS credits: 6**
Status: Elective Course		**Total number of contact hours: 90** Optional breakdown of hours by type:	
Course participants:	**Academic staff and associates selected in the field to which the course belongs/course**		
Prerequisite for enrollment:	None		
Course goal (goals):	Acquisition of educational and practical knowledge in the implementation of programs in the field of transport and environment. Acquiring knowledge and skills for adequate treatment of the problems of interdependence of transport and the environment, as well as the ability to make practical analyses and research.		

Topics covered (Units of study): *(if necessary, the weekly implementation plan is established taking into account the specificities of organizational units)*	1. Multidimensionality of transport and the environment 2. EU and BiH environmental legislation 3. Types and quality of fuels in the function of environmental protection 4. Road Traffic and Air Pollution 5. Air Traffic and Air Pollution 6. Rail Transport and Air Pollution 7. Environmental Information System – CORINAIR, AE DEM 8. Noise pollution and the environment 9. Noise Pollution and Road Traffic, 10. Traffic Models of Road Noise Noise Pollution and Air Traffic Noise Pollution and Rail Transport 11. Elements and Method of Making a Noise Map 12. Elements of Preparing an Environmental 13. Impact Study Environmental 14. Protection ISO Standards 15. Vibrations from traffic and the impact on the environment
Learning outcomes:	Knowledge: Theoretical and practical knowledge in the field of environmental impact of transport. Basic regulations, rules, methods and procedures in the field of assessment and analysis of the state of the environment depending on transport activities. Skills: Ability to apply theoretical and practical knowledge in the field of interdependence of transport and the environment in the function of preserving and protecting the environment on the one hand, or improving and developing transport on the other. Competencies: Ability to independently understand and use regulations, use professional literature, apply methods and procedures, measure and research, make analyses, assessments and practical solutions, preventive action, and procedures and procedures for monitoring (air quality and noise pollution) in the function of environmental protection with a balanced approach to the improvement and development of transport.
Sustainable Development Goal (SDG):	SDG4 – Quality Education SDG5 - Gender Equality SDG8 - Decent Work and Economic Growth SDG9- Industry, Innovation and Infrastructure SDG11 - Sustainable Cities and Local Communities SDG12-Sustainable consumption and production COR13-Climate Action SDG17- Partnerships for the Goals
Teaching methods:	Oral presentation with presentation and presentation of various systems and processes in the field of interdependence of transport and the environment, with the use of video and audio recordings, and independent presentation of certain specific problems of the impact of transport on the environment in a specific field of research. Initiating discussions and discussions on problems from practice, individual observations from different environments. Preparation of independent research and analyses in the field of interdependence of transport and the environment within the laboratory, on field conditions and other specific conditions of production and service processes.
Assessment methods with	Assessment of creativity in classes and exercises with the preparation of

<table>
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<td>grading structure:</td>
<td>independent papers, evaluation of the partial test during the class as well as the evaluation of the final exam. The criterion for monitoring the work and evaluation of the student during the course of the course is as follows:
– Seminar 15 points (%), passed if won over 50%.
– I Partial exam/test/knowledge test/35 points (%), is passed if more than 50% is scored.
– Final exam (II Partial) 50 points (%), passed if won over 50%.
– Final exam (Integral) 85 points (%), passed if won over 50%.

The total number of points (%) that a student can achieve during the course is a maximum of 50 points (%), which together with the Final (II partial) makes 100 points (%). For students who have not passed the I 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 paper/practical work makes 100 points (%).

The final success of the student after all the foreseen forms of examination is evaluated and evaluated by the grading system as follows: a) 10 (A) - exceptional success without errors or with minor errors, carries 95-100 points; b) 9 (B) - above average, with some error, carries 85-94 points; c) 8 (C) - average, with noticeable errors, carries 75-84 points; d) 7 (D) - generally good, but with more significant drawbacks, 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.
The total evaluation of all student obligations during the semester, i.e. the grade on the exam, is based on the total number of points (%) that the student has acquired by fulfilling the pre-exam obligations and passing the partial and final exam, according to the quality of the acquired knowledge and skills, and contains a maximum of 100 points, and is determined according to the following scale:

<table>
<tr><td>The Student's Responsibilities</td><td>Score (%)</td></tr>
<tr><td>Attendance at lectures and exercises
(attendance at all forms of teaching is mandatory at least 80% and this is a condition for the certification/signature of regular attendance)</td><td>0 points</td></tr>
<tr><td>Seminar</td><td>15 points (%)</td></tr>
<tr><td>I Partial Exam / Test / Knowledge Assessment /</td><td>35 points (%)</td></tr>
<tr><td>Final exam (II partial)</td><td>50 points (%)</td></tr>
<tr><td>Final exam (Integral)</td><td>85 points (%)</td></tr>
</table>
</td>
</tr>
<tr>
<td>Literature:</td>
<td>Mandatory:
1. Golubić, J., Promet i okoliš, Fakultet prometnih znanosti, Zagreb, 1999.
2. Lindov, O., Transport i okoliš, Fakultet za saobraćaj i komunikacije Univerziteta u Sarajevu, Sarajevo, 2011.
3. Lindov, O., Saobraćajna kultura, Fakultet za saobraćaj i</td>
</tr>
</table>

	komunikacije Univerziteta u Sarajevu, Sarajevo, 2012. 4. Lindov, O., Omerhodžić, A., Transport i okoliš, Skripta predavanja, Fakultet za saobraćaj i komunikacije Univerziteta u Sarajevu, Sarajevo, 2013. 5. Lindov, O., Omerhodžić, A., Transport i okoliš, Skripta zadataka, testovi za polaganje, Fakultet za saobraćaj i komunikacije Univerziteta u Sarajevu, Sarajevo, 2013. 6. Lindov, O., Pronello, C., Transport and environment air and noise pollution from transport activities, Politecnico di Torino, Department of Hydraulics, Transport and Civil Infrastructures, University of Sarajevo, Faculty of Traffic and Communications, University of Southampton, Department of Civil and Environmental Engineering, Transportation Research Group. 7. Lindov,O., Uticaj cestovnih vozila i cestovne infrastrukture na ekološke parametre, referat na međunarodnom skupu pod naslovom "Ekološki problemi suvremenog saobraćaja", ANU BiH, 2006.godine. Supplementary: 1. Barth M., Norbeck, J.M., Ross, M., NCHRP Project 25-11: The Development of a Comprehensive Modal Emissions Model, 7th CRC On-road Vehicle emissions workshop, San Diego, California, April 9-11, 1997. 2. Lindov, O,. Noise modeling and vibrations, „I Transversal, South Longitudinal and XII Transverzal" Fakultet za saobraćaj i komunikacije Univerziteta u Sarajevu, Sarajevo, 2010. 3. Lindov, O., Čekić, Š., Studija saobraćaja na području Kantona Sarajevo, Fakultet za saobraćaj i komunikacije Univerziteta u Sarajevu, Sarajevo 2005. 4. Lindov, O., Čaušević, S.,Studija Uticaj saobraćaja na okoliš na području Zeničko – dobojskog kantona, Fakultet za saobraćaj i komunikacije Univerziteta u Sarajevu, Sarajevo, 2009. 5. Lindov, O., Sigurnost u cestovnom saobraćaju, Fakultet za saobraćaj i komunikacije Univerziteta u Sarajevu, Sarajevo, 2008. 6. Lindov, O., Kazivanja o saobraćaju – Hronologija odabranih kazivanja u medijima 2002-2012, Institut za saobraćaj i komunikacije, Udruženje inžinjera u Bosni i Hercegovini, Sarajevo, 2013.