Sequence Diagram: Email OTP Verification (UC-03)

Participants: User, Browser, Register Page, POST /api/auth/register, POST /api/auth/otp/send, POST /api/auth/otp/verify, OTP Service, Email Service, MongoDB

Registration Triggers OTP

- User → Browser: Submit registration form
- Browser → Register Page: POST {name, email, password}
- Register Page → MongoDB: Create user (emailVerified: false)
- MongoDB --> Register Page: User created
- Register Page → OTP Service: generateOTP(email)
- OTP Service → OTP Service: Generate 6-digit OTP / Store with 5-min expiry
- OTP Service --> Register Page: OTP code
- Register Page → Email Service: sendVerificationEmail (email, otp)
- Email Service --> Register Page: Sent
- Register Page --> Browser: 201 "Account created, verification email sent"
- Browser --> User: Show OTP input field

User Enters OTP

- User → Browser: Enter 6-digit OTP
- Browser → POST /api/auth/otp/verify: POST {email, otp}
- POST /api/auth/otp/verify → OTP Service: verifyOTP(email, otp)

alt [OTP invalid or expired]

- OTP Service --> POST /api/auth/otp/verify: false
- POST /api/auth/otp/verify --> Browser: 401 "Invalid or expired OTP"
- Browser --> User: Show error message

opt [User requests resend]

- User → Browser: Click "Resend OTP"
- Browser → POST /api/auth/otp/send: POST {email}
- POST /api/auth/otp/send → MongoDB: Check user exists and not yet verified
- MongoDB --> POST /api/auth/otp/send: User found
- POST /api/auth/otp/send → OTP Service: generateOTP(email)
- OTP Service → OTP Service: Invalidate old OTP / Generate new 6-digit OTP
- OTP Service --> POST /api/auth/otp/send: New OTP code
- POST /api/auth/otp/send → Email Service: sendVerificationEmail (email, otp)
- Email Service --> POST /api/auth/otp/send: Sent
- POST /api/auth/otp/send --> Browser: 200 "OTP resent"
- Browser --> User: Show success message

[OTP valid]

- OTP Service --> POST /api/auth/otp/verify: true
- OTP Service → OTP Service: Delete used OTP
- POST /api/auth/otp/verify → MongoDB: Update user (emailVerified: true)
- MongoDB --> POST /api/auth/otp/verify: Updated
- POST /api/auth/otp/verify --> Browser: 200 "Email verified"
- Browser → Register Page: router.push('/login')
- Register Page --> User: Redirect to login page with success message